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William Whitman & Co.

1910



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**"... Let cheerfulness abound with in=
dustry. . . . Give us to go blithely
on our business all
this Day. . . ."**

—Robert Louis Stevenson





A FLOCK OF THREE THOUSAND SHEEP

The fleeces of this whole flock would be consumed *in less than two hours* by the Arlington Mills in the course of its manufacturing operations

A BRIEF OUTLINE OF THE
BUSINESS OF WILLIAM
WHITMAN & CO.



BOSTON · NEW YORK · CHICAGO · ST. LOUIS
PHILADELPHIA · CHARLOTTE
BALTIMORE · ATLANTA

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BY MALCOLM D. WHITMAN

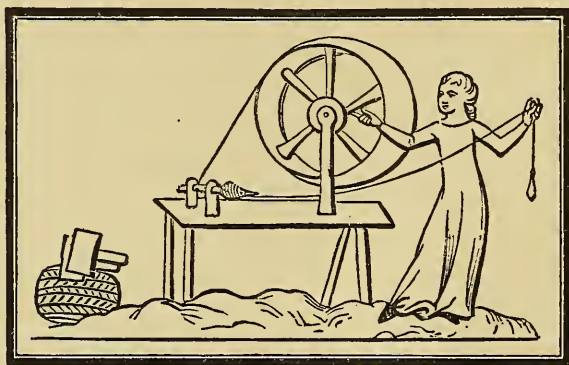


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To
Our Associates and our Customers
who have Co-operated with us
in the Development of the
Business Outlined in
these Pages



HAND SPINNING

From a Fourteenth Century MS. in the British Museum

PREFACE

WE have had occasion during the past year to prepare an outline of the scope and organization of our business. In the course of the work it occurred to us that there was some information that would be of interest to our associates, to our customers, and to others who are studying the progress of textile manufacture in this country.

We have attempted to embody this information in a brief form in the following pages.



LADIES SPINNING AND WEAVING

From a Fifteenth Century MS. in the British Museum

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THE firm of WILLIAM WHITMAN & COMPANY and its predecessors have been the selling agents of the Arlington Mills from 1887 until the present time. Mr. William Whitman, the senior member of the firm, has served as Treasurer or President of the Arlington Corporation since 1867.

The present members of the firm are

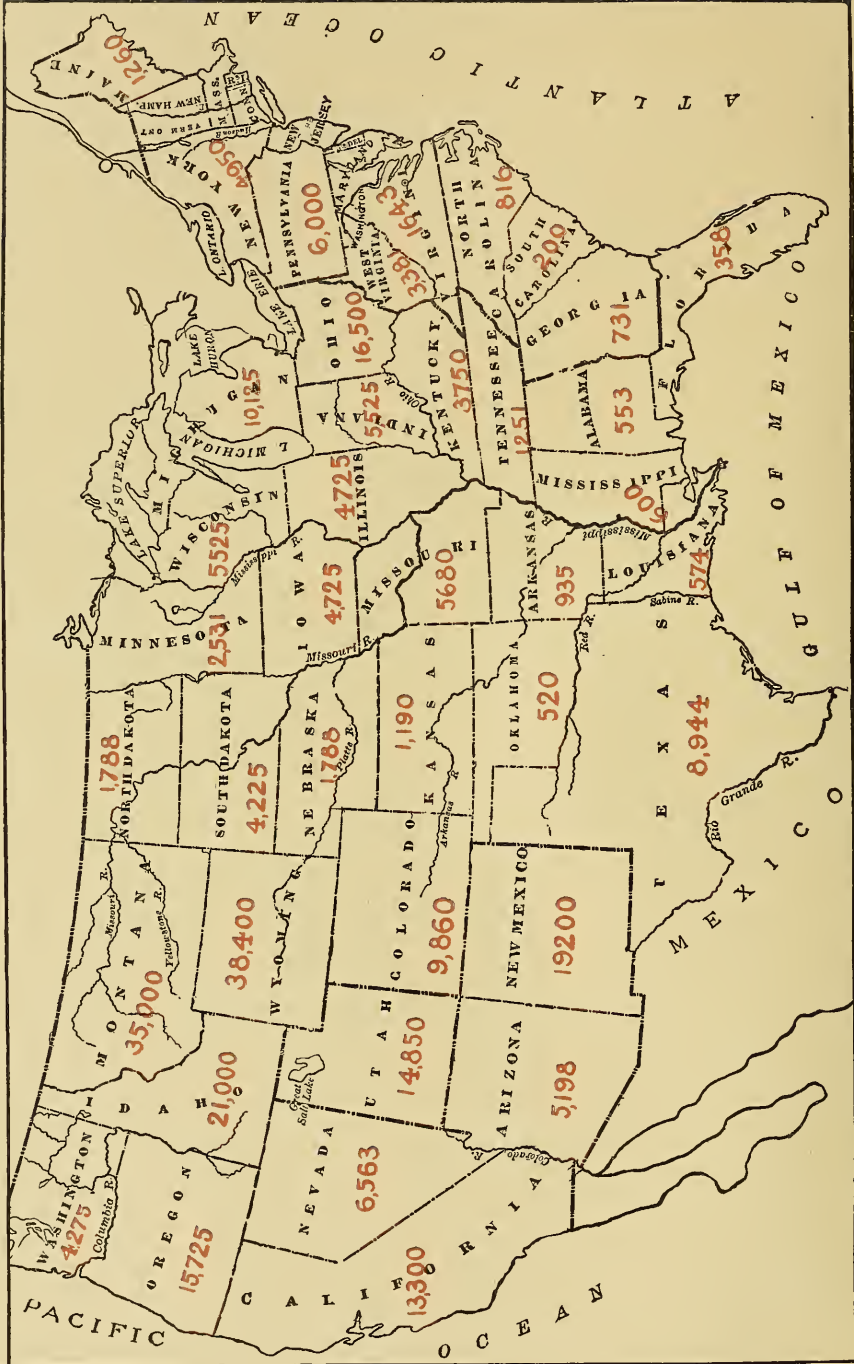
WILLIAM WHITMAN
WILLIAM WHITMAN, JR.
ARTHUR T. BRADLEE
MALCOLM D. WHITMAN
LOUIS H. FITCH

Mr. William Whitman, Mr. Bradlee, and Mr. Fitch have their headquarters in the home office of the firm at 78 Chauncy St., Boston. Mr. William Whitman, Jr., and Mr. Malcolm D. Whitman are in charge of the New York Office of the firm at 350 Broadway, New York City.

The firm offices are: 78 Chauncy St., Boston; 350 Broadway, New York; Royal Insurance Building, Chicago; 300 Chestnut St., Philadelphia; Century Building, St. Louis; Maryland Bank Building, Baltimore; Equitable Building, Atlanta; 201 South Tryon St., Charlotte.

WOOL PRODUCTION OF THE UNITED STATES

(Expressed in thousands of pounds)



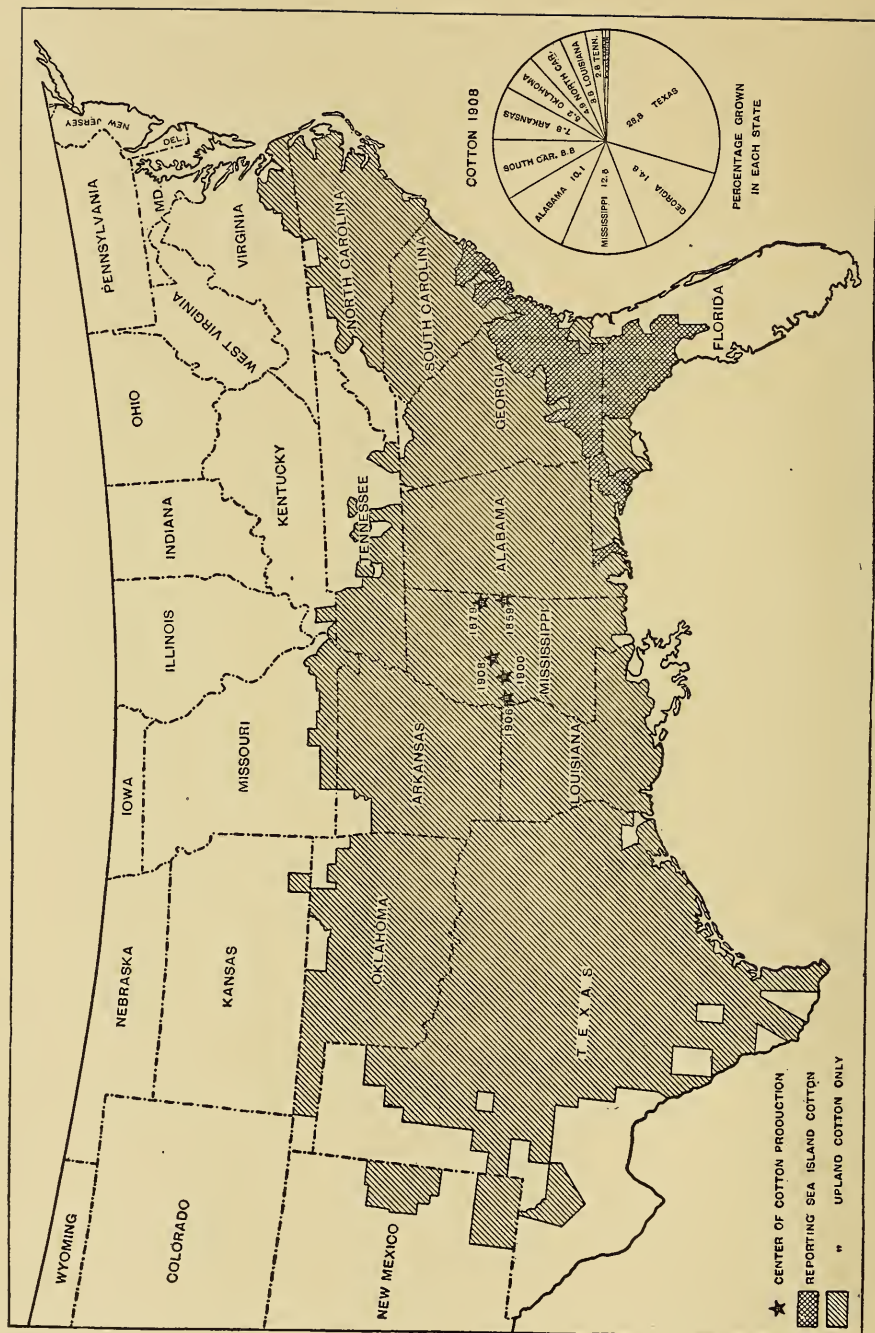
New Hampshire	434	Total Clip of United States, 1909	287,110,749 pounds
Vermont	1,170	Pulled Wool	41,000,000 "
Massachusetts	210	Total Product, 1909	328,110,749 pounds
Rhode Island	40		
Connecticut	190		
New Jersey	212		
Delaware	40		
Maryland	625		

WOOL PRODUCTION OF THE WORLD

(From the latest official returns and estimates)

COUNTRY		WOOL POUNDS
<i>North America</i>	United States	328,110,749
	British Provinces	11,210,000
	Mexico	7,000,000
	Central America and West Indies	1,000,000
Total North America		347,320,749
<i>South America</i>	Argentina	392,418,800
	Brazil	1,130,000
	Chile	20,754,000
	Peru	9,940,000
	Falkland Islands	4,324,000
	Uruguay	111,552,760
	All other South America reported	5,000,000
Total South America		545,119,560
<i>Europe</i>	United Kingdom	133,705,074
	Austria Hungary	41,600,000
	France	78,000,000
	Germany	25,600,000
	Spain	52,000,000
	Portugal	10,000,000
	Greece	14,000,000
	Italy	21,500,000
	Russia (Europe)	320,000,000
	Turkey and Balkan States	90,500,000
All other Europe		18,000,000
Total Europe		804,905,074
<i>Asia</i>	British India	50,000,000
	China	42,253,000
	Russia (Asiatic)	60,000,000
	Turkey (Asiatic)	45,000,000
	Persia	12,146,000
	All other Asia reported	1,000,000
Total Asia		210,399,000
<i>Africa</i>	Algeria	33,184,000
	British South Africa	89,783,000
	Tunis	3,735,000
	All other Africa reported	13,000,000
Total Africa		139,702,000
<i>Oceania</i>	Australasia	756,590,163
	All other Oceania reported	100,000
Total Oceania		756,690,163
Total World		2,804,136,546
World's production 1895		2,692,986,773

COTTON PRODUCING AREA OF THE UNITED STATES



THE WORLD'S COTTON PRODUCTION

(From the latest returns and estimates)

The world's commercial crops in bales of the uniform weight of 500 lbs. net each.

COUNTRIES	1908-09	1907-08	1906-07	1905-06	1904-05
United States	13,551,890	11,257,538	13,306,846	11,048,000	13,420,440
India (a)	3,084,870	2,486,629	3,536,086	2,983,370	2,952,720
Egypt	1,246,150	1,432,469	1,326,108	1,152,516	1,244,968
Russia	601,200	711,864	781,760	1,020,456	683,064
Brazil, etc. (b)	266,197	299,006	446,126	476,667	325,928
TOTAL	18,750,307	16,187,506	19,396,926	16,681,009	18,627,120

(a) Includes India's exports to Europe, America, Japan, etc., and mill consumption in India increased or decreased by excess or loss of stock at Bombay.

(b) Receipts into Europe from Brazil, Smyrna, Peru, West Indies, etc., and Japan and China cotton used in Japanese mills.

These figures, revised to December 1, 1909, from statistics furnished by the Commercial and Financial Chronicle, show the world's commercial cotton so far as known from reliable data. There is in addition considerable cotton, consumed locally in India, Brazil, and other countries, which does not enter into commercial channels and so cannot be determined. It is thought that 600,000 bales are worked each year on hand looms in the homes of the people in India, and that 149,000 bales each year are consumed locally in Brazil, but the data as to this local consumption are very indefinite. Little is known also to-day of the production and consumption of cotton in China.

The world's cotton crop in running bales has been estimated by Comtelburo Limited, of London, as follows :

COUNTRIES	1908-09	1907-08	1906-07	1905-06	1904-05
America	13,829,000	11,582,000	13,550,000	11,320,000	13,557,000
India	4,665,000	4,445,000	5,197,000	4,797,000	4,061,000
Egypt	910,000	965,000	926,000	798,000	843,000
Brazil, etc.	†3,063,000	†2,867,000	†2,803,000	†2,542,000	†2,172,000
TOTAL	22,467,000	19,859,000	22,476,000	19,457,000	20,633,000

† Including all other countries. The countries embraced in this list are also given by Comtelburo, together with estimates of production of each.

The estimate of Mr. Alfred B. Shepperson of the world's crops in running bales for 1908-09 is 22,287,000 bales. This corresponds closely with the estimate of Comtelburo for the same period.

The estimates in running bales include under "Brazil, etc." the local consumption in Brazil, India, and other countries, and China's rumored production. They are, therefore, greater than the first estimate above, but the difference is more apparent than real.

EGYPTIAN COTTON

The entire importation of Egyptian Cotton into the United States, expressed in bales of 500 lbs. net wt. for the past ten seasons, ending August 31st, is as follows:

1908-1909	145,361	1903-1904	80,107
1907-1908	126,102	1902-1903	131,799
1906-1907	178,069	1901-1902	166,617
1905-1906	119,890	1900-1901	87,441
1904-1905	110,573	1899-1900	122,009

PERUVIAN COTTON

The entire importation of Peruvian Cotton into the United States, expressed in bales of 500 lbs. net wt. for ten seasons, ending August 31st, is as follows:

1908-1909	12,811	1903-1904	7,462
1907-1908	5,296	1902-1903	9,744
1906-1907	8,900	1901-1902	10,398
1905-1906	6,337	1900-1901	9,612
1904-1905	9,748	1899-1900	8,196

SEA ISLAND COTTON

The crops and movement of Sea Island Cotton, expressed in bales of 500 lbs. net wt. for the past ten seasons, ending August 31st, are as follows:

SEASON	CROP				FOREIGN EXPORTS			AMERICAN CONSUMPTION ^a
	Florida	Georgia	South Carolina	Total	Great Britain	Continent	Total Exports	
1908-09-	33,701	31,162	12,138	77,001	14,593	6,052	20,646	57,061
1907-08-	33,490	21,606	10,190	65,286	18,198	7,708	25,906	37,374
1906-07-	18,729	19,722	6,435	44,886	12,160	4,231	16,391	28,881
1905-06-	24,302	58,298	10,970	93,570	24,027	7,382	31,410	63,138
1904-05-	30,298	39,757	9,675	79,730	24,666	6,056	30,722	50,045
1903-04-	22,404	31,476	7,487	61,367	19,350	5,706	25,056	34,862
1902-03-	22,149	49,961	9,998	82,108	35,483	7,782	43,266	40,419
1901-02-	17,058	38,870	7,008	62,936	20,338	5,160	25,498	34,920
1900-01-	19,834	42,362	6,695	68,891	21,162	4,428	25,590	44,338
1899-00-	23,501	48,295	6,248	78,044	30,623	6,406	37,029	39,634

^a The column of "American Consumption" in this table includes burnt in the United States.

In this compilation, the Sea Island bales (400 lbs.), the Egyptian bales (750 lbs.), and the Peruvian bales (185 lbs.) have all been converted into bales of the net weight of 500 lbs. each.

THE PRINCIPAL COTTONS

THE different kinds of cotton in general commercial use in this country may be briefly mentioned. They are Upland Cotton, forming the great bulk of cotton grown in the United States; Sea Island Cotton, from our southeastern coast; Egyptian Cotton, from the valley of the Nile; and Peruvian Cotton, from South America.

Of the 13,800,000 bales of Upland Cotton produced last season, we retained for use in this country but 5,400,000 bales. Our consumption of Sea Island, Egyptian, and Peruvian Cotton is indicated in the opposite table.

Sea Island Cotton, grown almost exclusively in Florida, Georgia, and South Carolina, is our finest cotton, having a silky staple from $1\frac{1}{2}$ inches to $2\frac{1}{2}$ inches in length. For yarns numbering over 120, and for the best cloths, Sea Island Cotton is indispensable. It commands a price from 50 to 100 per cent above that of Egyptian Cotton.

Egyptian Cotton has a strong, lustrous staple $1\frac{1}{8}$ inches to $1\frac{5}{8}$ inches long. It is used for purposes for which Upland Cotton would not be suitable, and for which Sea Island Cotton is too expensive. It is used extensively for fine underwear and hosiery, much of it going into so-called "Balbriggan" goods.

Peruvian Cotton, of the kind imported into this country, is of the "tree cotton" variety and has a rough, kinky staple. It resembles wool so closely that it is called "vegetable wool," and can be distinguished from wool only by microscopical examination. Peruvian Cotton is not used in cotton mills, but is manufactured in combination with wool into certain grades of woollen fabrics.

WILLIAM WHITMAN & CO.

SOLE SELLING AGENTS

FOR

Arlington Mills *of Lawrence, Massachusetts*

WORSTED DRESS GOODS, WORSTED TOPS, WORSTED YARNS,
COMBED COTTON YARNS, MERCERIZED YARNS

The Eddystone Manufacturing Company *of Eddystone, Pennsylvania*

SIMPSON-EDDYSTONE PRINTS, GOBELIN ART DRAPERIES,
PRINTED COTTON FABRICS

Manomet Mills *of New Bedford, Massachusetts*

COMBED COTTON YARNS

Nashawena Mills *of New Bedford, Massachusetts*

PLAIN AND FANCY COTTON FABRICS, COTTON AND SILK MIX-
TURES, CONTRACT SPECIALTIES

Nonquitt Spinning Company *of New Bedford, Massachusetts*

COMBED COTTON YARNS

and for a number of smaller cotton cloth and
cotton yarn mills.

*IN addition, William Whitman & Company, as mer-
chants, purchase outright and distribute the products
of a large number of other cotton mills.*

INTRODUCTION

WE hope that this little book may not only interest our customers and business associates, but may make them even more familiar than they now are with the policy of management and the nature and scope of our business as a whole.

The successful development of the business is due largely to the co-operation of our friends among buyers, consumers, and associates. If this little book will help to promote that spirit of co-operation and to spread its influence among new friends and associates, it will have served its purpose.

The policy of the firm of William Whitman & Company has always been to avoid any duplication or conflict of the products of the different manufacturing concerns which the firm serves as exclusive selling agent. The whole business has been organized and developed in accordance with this principle. The output of one mill is not brought into competition with that of another. The various manufacturing activities have been so co-ordinated that the products of the different mills represented, instead of duplicating, supplement each other all along the line.

The result is that to-day the products marketed by the firm cover an unusually broad range, selling efficiency is promoted, as the selling of one product

INTRODUCTION

naturally leads to the selling of another, and the mills gain because they are enabled to specialize on the particular products for which they are best adapted. The machinery of each mill is kept continuously employed in the manufacture of those things which it can produce at the least cost and to the best advantage.

The firm acts as sole selling agent for the Arlington Mills of Lawrence, Massachusetts, The Eddystone Manufacturing Company of Eddystone, Pennsylvania, the Manomet Mills of New Bedford, Massachusetts, the Nonquitt Spinning Company and the Nashawena Mills of the same city, and also for a number of smaller cotton cloth and cotton yarn mills. The firm also acts as a dealer in cotton yarns, purchasing large quantities of yarn outright from the spinners and distributing them through the channels of the trade to a wide range of customers. The yarns so purchased and distributed supplement and are supplemented by the products of the above mills. The different ranges of product strengthen the general line that is handled and so strengthen each other.

The mills represented and the firm co-operating with them give steady employment to more than fourteen thousand persons, whose combined efforts are constantly directed toward producing and distributing materials that are indispensable for the clothing of the people. It is an inspiration to realize that in return for what he or she receives every one

INTRODUCTION

of these wage earners is contributing toward the common good. The dignity of labor and the privilege of work should be appreciated by those who have at heart the general welfare of this country. The belief that labor is dignified and that to work is and should be a privilege is one of the greatest sources of our energy as a people. The dignity of labor and the privilege of work are the keynotes of our remarkable industry.

The firm of William Whitman & Company markets a large quantity and a great variety of textile fabrics. These fabrics are made from wool, cotton, and silk, and mixtures of these three principal raw materials. A maximum output of more than one hundred and sixty-five million running yards of cloth passes from the looms in the course of a single year — enough to form a strand from two to about five feet in width, winding three times around the world, with many thousand miles of cloth to spare. The raw wools, cottons, and silks required for this output of fabric are drawn from all the continents and embody almost all grades and varieties. These raw materials represent great value when spun into yarns and further worked by patient intricate processes into all-wool cloths, superior worsted fabrics, silk-filled goods, printed fabrics, and the many costly cloths described in later chapters.

The quantity of fabric woven each year is impressive, but it measures only a part of the business.

INTRODUCTION

In addition to cloth the firm markets large quantities of worsted yarn, of cotton yarn, and of the semi-manufactured article known as "tops"—wool combed and fully prepared for the spinner. The output of yarns and tops, most of which are sold to other manufacturers of textiles, even exceeds the output of cloth in point of value.

The yearly consumption of the wools and cottons converted into these diversified products is in excess of one hundred and seventy-five million pounds. The wool that is used in a year is equivalent to about one-sixth of the entire wool clip of the United States. The fleeces of thirty-three thousand sheep are consumed in the manufacturing operations of a single day. Forty-four mills of the capacity of the Arlington Mills alone could absorb the wool product of the entire world. The cotton used each year, in number of pounds, is even greater than the corresponding quantity of wool. The kinds of cotton and the grades of wool in this vast consumption will be mentioned in later chapters.

The business of the firm is organized or arranged in five large departments :

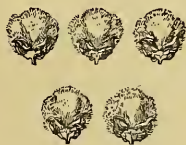
1. Dress Goods Department.
2. Worsted Yarn Department.
3. Cotton Yarn Department.
4. Printed Goods Department.
5. Gray Goods Department.

In order to conduct a business of such diversity and magnitude a harmonious and efficient organiza-

INTRODUCTION

tion is indispensable. The organization in general, and some of its purposes, will be outlined in the subsequent discussion of the several departments or subdivisions of the business.

In discussing the different departments the particular products marketed by each department and the varied uses of those products will also be described.



ARLINGTON MILLS

Incorporated in 1865, under the laws of the Commonwealth of Massachusetts

CAPITAL STOCK, \$8,000,000

Executive Offices 78 CHAUNCY ST., BOSTON
Mills . . LAWRENCE AND METHUEN, MASSACHUSETTS

OFFICERS

WILLIAM WHITMAN *President*
FRANKLIN W. HOBBS *Treasurer*

DIRECTORS

GEORGE E. BULLARD	FRANKLIN W. HOBBS
LIVINGSTON CUSHING	GEORGE E. KUNHARDT
WILLIAM F. DRAPER	CHARLES W. LEONARD
ROBERT H. GARDINER	RICHARD S. RUSSELL
JAMES R. HOOPER	GEORGE M. WHITIN

WILLIAM WHITMAN

Clerk of the Corporation

C. EATON PIERCE

Resident Agent

WILLIAM D. HARTSHORNE

Lawrence, Massachusetts

Transfer Agent

THE NEW ENGLAND TRUST COMPANY

135 Devonshire Street, Boston, Massachusetts





THE FIRST ARLINGTON MILLS, 1865
Lawrence, Massachusetts

DRESS GOODS DEPARTMENT

THIS department of the firm of William Whitman & Company markets all the dress goods manufactured by the Arlington Mills. The Arlington Mills began the manufacture of worsted fabrics almost half a century ago. At that time the industry in America was conducted under severe difficulties—a high standard of perfection had already been attained by foreign manufacturers, and the best worsted fabrics worn in this country were almost all imported from Europe. Not only were there few men in this country who were skilled in the various branches of worsted manufacturing, but there was also a distinct prejudice against American-made goods. Through persistent effort, however, and especially through obtaining the best designers, weavers, spinners, and dyers trained in the art, the Arlington Mills gradually brought the products of their looms to compare favorably with the best products of Europe.

This progressive course has been steadily continued. Machinery has been perfected and the highest skill and experience secured, until to-day the worsted dress fabrics for women's and children's garments made by the Arlington Mills are nowhere excelled in those particular lines they manufacture.

In order to maintain and improve this standard of quality, and strengthen this prestige, the mills have a representative abroad who visits the great centres of fashion, and so keeps the home office informed as to the new creations of foreign designers and the trend

of ideas among those whose profession it is to fix or follow fashion. This knowledge is supplemented by the efforts of a corps of competent designers in the mills and in the offices of William Whitman & Company. The mills have agents also all over the world to select and purchase the special wools best adapted for each particular fabric. These agents attend all of the great wool sales in this country and in Europe, Australia, and South America.

Nearly all of the varieties of combing wools grown in the world are used — Australian merino and cross-bred wools; South American merino and cross-bred wools; Cape merino wools; merino and cross-bred wools grown in the United States and territories; the lustrous wools of pure English blood; mohair from Asiatic Turkey, and alpaca from the Andes. Mohair, the hair of the Angora goat, supplied largely by Asiatic Turkey, is used in fine woven fabrics requiring a brilliant lustre or sheen. Alpaca, the hair of the South American llama, which comes largely from the mountains of Peru, is made into black fabrics of light weight and is largely used for brilliantines and linings.

At first dress fabrics were sold by the firm almost entirely to the large dry goods jobbing houses, by which they were distributed to retailers throughout the country. The fabrics were made in widths varying from 36 to 50 inches, and were sold by retailers over the counter to their customers. These materials were either made up at home or were taken by the purchaser to a tailor or dressmaker to be made into garments.

A gradual change, however, has developed in the method of distribution. There has come a great demand for ready-to-wear garments, a demand that has increased wonderfully within the past few years. The



THE ANGORA GOAT (FROM WHICH MOHAIR IS OBTAINED)
ASIA MINOR

DRESS GOODS DEPARTMENT

manufacturers of ready-to-wear clothing buy their own fabrics, make up the garments from these fabrics, and sell them through the usual channels of trade. These manufacturers use a vast amount of worsted dress goods every year, and for this particular trade special fabrics have to be produced. These fabrics have to have a uniform width and to be of such a character that they can be handled in great quantities. The width most suitable for this trade is the uniform width of 54 inches.

In order to meet the demand of this particular trade, known as the manufacturing or cutting-up trade, the Arlington Mills have equipped themselves to produce dress fabrics of a special kind, put up in a special way, and adapted directly for the needs of the manufacturer of ready-to-wear garments. A special sub-department has been created by the firm of William Whitman & Company to distribute these fabrics most efficiently.

The whole Dress Goods Department is now organized to meet satisfactorily the demands of the jobbing trade and the manufacturers of ready-to-wear clothing. The greatest care and thought are given to the creation of styles, to the construction of cloths, and to the other requirements of each particular trade.

The manufacturing trade is large and steadily growing, as we have stated. It must be borne in mind, however, that out of the wide variety of dress fabrics that are manufactured, only a portion are suitable for ready-made garments. The dressmaker, both domestic and professional, is still and will continue to be a very important factor. The fabrics that are consumed by the dressmakers of the country are all distributed through the large dry goods jobbing houses. They are vast in quantity, and the great business of retailing fabrics over the counter is sure to continue as heretofore.

The dress goods of the Arlington Mills fall naturally into two distinct classes when regarded from the standpoint of fashion — Staples and Fancies. Staples are those fabrics which are made of the same construction year in and year out. They vary only in coloring, to meet the changes of fashion.

The Staples in which the Arlington Mills specialize are Brilliantines, Sicilians, Mohairs, Imperial Serges, Storm Serges, Cheviots, Panamas, Batistes, Taffetas, Voiles, Nun's Veilings, Cashmeres, Shepherd Checks, etc.

Fancies include all kinds of novelties. In one class of these novelties the different effects are produced through variation of weave, in another class principally through variation of color, and in still another class through variations of color and weave, or through odd intermixtures of the materials going into their construction. The class in which effects are produced through the weave includes Berbers, Brocades, Brocettes, Crispettes, Melroses, Hopsackings, etc. The class in which the effects are produced largely through coloring includes Stripes, Checks, Plaids, Melanges, Mixtures, etc. The third class includes fabrics so novel in their makeup that the names applied to them change from time to time and have no established significance. The names are as changeable as the fabrics themselves. In general, Fancies or Novelties comprise that great variety of fabrics in vogue for a time, but for which the demand for any particular style is transitory. They change from year to year, according to the dictates of fashion.

It is necessary, therefore, to anticipate in a measure what particular styles or constructions will be popular in the trade during any given season. In this connection the representative of the mills who travels through the





THE SECOND ARLINGTON MILLS, 1867
Lawrence, Massachusetts

principal cities of Europe keeps the home office informed of what the fashions are abroad. Although to-day this country is growing more and more independent of Europe as to style, nevertheless it is true that the dressmakers and tailors of Europe have a great deal of influence over fashions in this country. What the foreign dressmakers are doing, therefore, must be taken into consideration and weighed with other information in order properly to anticipate what the trade is likely to demand.

From the manufacturer's standpoint — that is, from the standpoint of one who considers the method of construction and the materials that go into the different fabrics — the Arlington Mills dress goods may be classified under three general heads: Piece-Dyed Fabrics, Cross-Dyed Fabrics, and Yarn-Dyed Fabrics.

Piece-Dyed Fabrics are woven with the yarns (the separate threads that are wrought together to make the fabric) in their gray or natural state. They are then cleansed and dyed in the piece to such colors as are required. They are woven in plain weaves in a great variety of twills, stripes, and figures, all the way from a plain spot to an elaborate brocade. These fabrics may be made wholly of worsted yarns, or of worsted yarns in combination with cotton yarns, or of worsted yarns in combination with cotton yarns that have been put through the mercerizing process to look like silk, or of worsted yarns with silk yarns or wool yarns. The principal fabrics in this classification are: Imperial Serges, Storm Serges, Cheviots, Panamas, Veilings, Prunellas, Whipcords, Melroses, Poplins, Venetians, Coverts, Satins, Batistes, Taffetas, Voiles, Nun's Veilings, Canvases, Grenadines, Albatrosses, Crepes, Rainproof cloths, Cashmeres, Silk-Warp Henriettas,

and, in fact, an endless variety of plain and fancy Suitings.

Cross-Dyed Fabrics are woven with black or colored cotton warps — that is, the yarns or threads that run lengthwise in the fabrics — and wool or worsted filling — that is, the yarns or threads that run across the fabrics. After being woven, these fabrics are dyed in the piece. The cotton does not take the wool dye, but retains its original color. This class of work is more generally used in what are known as Mohair, Alpaca, and Lustre fabrics. This process is adopted instead of subjecting the goods to a cotton-dye bath after being woven, because in this way the natural brilliancy of the Lustre wool, Mohair, or Alpaca in the filling is not impaired. The cotton-dye bath is liable to destroy the lustre, and for this reason a part of the goods — that is, the cotton portion — is dyed before the weaving takes place. The principal cross-dyed fabrics are Brilliantines, Alpacas, Mohairs, Florentines, Glacés, Cotton-Warp Taffetas, Batistes, Serges and Cashmeres, Crispettes, Fancy Lenos, Fancy Waistings, and Rainproof cloths. They have the same variety of weaves and patterns as have piece-dyed goods. The Arlington Mills have made a specialty of cross-dyed fabrics, which form a large part of their product.

Yarn-Dyed Fabrics are woven from dyed yarns or from yarns spun from dyed wool. This process is particularly applicable to Shepherd Checks, Mixtures, Melanges, Fancy Checks and Plaids, and Fancy Cloakings and Suitings. The box loom is used in the manufacture of these cloths more than in other cloths. The desired effects can be produced in all-wool fabrics, cotton-warp fabrics, or in fabrics made of a mixture of cotton and wool. The different effects, however, are



THE ALPACA, PERU

obtained in this class of merchandise more through skilful variations of color and pattern than through changes in construction of the cloth.

Staple Fabrics and Fancies or Novelties all fall within the above classification. They are either yarn-dyed, piece-dyed, or cross-dyed. The Arlington Mills dress fabrics are now made in weights from 3 to 12 ounces a yard and in widths varying from 28 inches to 56 inches. These fabrics are made to meet the requirements of the great masses of the people, and the fabrics are distributed widely throughout the United States. Perhaps the most characteristic feature of this dress goods branch of the Arlington Mills business is the making of specialties for the trade on orders, which have heretofore been made solely in Europe. This business has recently grown to large proportions. Importers and others are enabled to place orders for novelties in cloths, with the understanding that the same article, or any article so closely resembling it as to conflict with its sale, shall not be made by the Arlington Mills for other houses. In this way the individuality of each firm, as to taste or design, can be reserved to its own use or advantage.

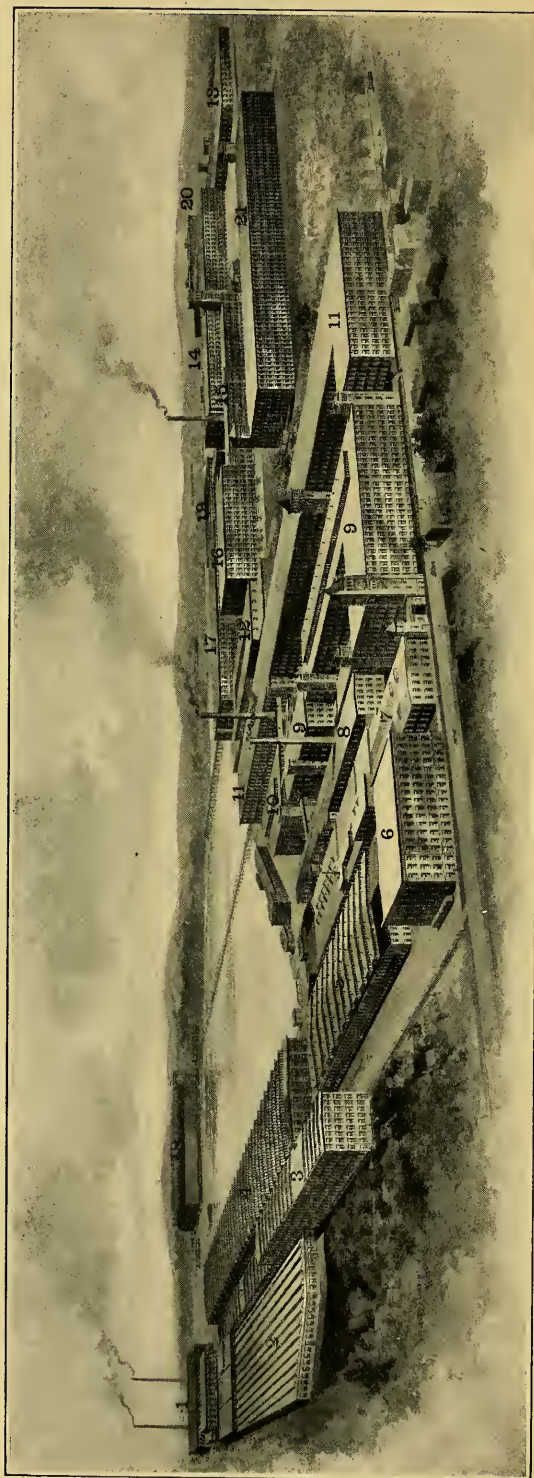
Dress goods, strictly speaking, are made only for women and children. The Dress Goods Department, however, markets other fabrics of the Arlington Mills which are not strictly dress goods. The Arlington Mills are especially equipped to manufacture linings for men's coats and suits. For light-weight linings, for ordinary suits, cotton-warp or Alpaca or plain linings are used. In order to obtain the highest lustre these linings are made from dyed cotton warps, and filling made with Alpaca, Mohair, or highly lustrous wool. They are woven in plain weaves, and the very greatest ✓

care has to be taken in dyeing and finishing them to preserve their brilliant lustre.

For the heavier linings a cotton-warp serge is used. These are manufactured from the same materials as the lighter linings, but the weave is made up of a variety of twills instead of being plain. Great quantities of these serges are used wherever a lining of some weight is required. Success in the manufacture of this fabric rests almost entirely with the finish. The Arlington Mills, however, are among the few in this country that are fitted to finish successfully this class of merchandise. Another class of linings is used to line overcoatings. These linings are made in a variety of checks and plaids, usually woven from dyed yarns, either all-wool or cotton warps, or a combination of worsted and cotton yarns. In addition to linings the Arlington Mills manufacture special cloths that are put by the purchasers through various patented processes and made into automobile tops, curtains, and seat coverings. The extensive use of the automobile has created a great demand for materials suitable for these purposes. It has also created a demand for cloths fitted for garments to be worn in motoring, such as dusters, cloakings, raincoats, etc. The Arlington Mills have been making a careful study of these particular cloths suitable for all purposes connected with the automobile, and are equipped to manufacture in large quantities all the varieties that are required.

The automobile cloths and the linings, as well as the dress goods, are distributed by the Dress Goods Department through the usual channels of trade which we have described.





ARLINGTON MILLS, 1910

Lawrence and Methuen, Massachusetts

Worsted Department — 1, Power House. 2, Dye House. 3, Finishing and Warp Dressing Building. 4, Weave Shed No. 2. 5, Weave Shed No. 1. 6, Administration Building. 7, Slubbing Dye House. 8, Machine Shop. 9, Worsted Spinning Mill. 10, Storehouse. 11, Top Mill. 12, Solvent Plant. *Cotton Department* — 13, Picker House and Card Room. 14, Spinning Mill. 15, Twisting Mill. 16 and 17, Dye House, Mercerizing, Warping, Reeling, etc. *Coal Pockets*, 18.

Additions 1909-1910 — 19, Extension to Mercerizing Plant. 20, New Cotton Storehouse. 21, New Worsted Spinning Mill.

WORSTED YARN DEPARTMENT

THIS department handles the entire production of the Arlington Mills in worsted yarns and in what are known as "tops" — already described in a preceding chapter as wool combed and prepared for spinning. In addition, the Arlington Mills have made a specialty of combing wool on commission for other mills, and this work is also handled through this department. In the manufacture of worsted yarns and tops, the Arlington Mills consume practically every kind of wool grown in the world that is suitable for clothing purposes, from the finest merino Australian wool for the highest class of goods to the lower grades of combing wool.

The work of the Worsted Yarn Department may be classified under three heads: Worsted Yarns, Worsted Tops, and Commission Combing. Each of these divisions will be separately considered.

First, as to Worsted Yarns, it may be said that the production of perfect worsted yarns is probably the most difficult form of textile manufacture. For many years prior to the Civil War it was assumed that because of climatic and other conditions the spinning of these yarns could not be conducted in the United States. In 1854 the English worsted manufacturers of Bradford presented to Congress, through the British Minister in Washington, a memorial urging the reduction of the then low *ad valorem* duty of 25 per cent on worsteds for

the reason that they "do not come into competition with American goods." What is more, the American Congress actually granted the petition of these foreign manufacturers and in 1857 reduced the duty to a point where American competition was believed to be impossible! Yet there was at that time an impression in this country that the American people had successfully established their independence of external authority in the Revolution of 1775-1783.

Step by step, however, the successful manufacture of worsted yarns and fabrics has been developed in the United States, and one technical difficulty after another has been overcome by force of ingenuity and perseverance. The Arlington Mills, pioneers in this great work, are producing many million pounds of worsted yarns every year. An enormous quantity of these yarns is required by the weaving department of the mills for manufacturing the diverse, beautiful, and useful fabrics described in the preceding chapter. But over and above the consumption of the Arlington looms themselves another very great quantity of worsted yarn, produced by the Arlington spindles, is available for sale to other manufacturers. These yarns that are thus sold enter into almost every kind of worsted cloth. They are purchased not only by other mills manufacturing ladies' and children's dress goods, but also by the manufacturers of men's wear. They are utilized in the production of underwear, hosiery, sweaters, and braids. The yarns are spun in practically all qualities and degrees of fineness, and are delivered

WORSTED YARN DEPARTMENT

in the gray, in solid colors, in fancy mixtures, or in doubles and twists. The following list of worsted yarns that are produced for sale by the Arlington Mills to manufacturers who do not do their own spinning will serve to illustrate the broad range of choice offered to purchasers.

ARLINGTON MILLS WORSTED YARN SPECIALTIES

ENGLISH SYSTEM SPINNING

TWO OR MORE PLY GRAY

Warp and Filling.

Delivered in Skeins, on Spools or Dresser Spools.

SINGLE GRAY

Warp and Filling.

Delivered on Filling Bobbins, Quiller Bobbins, Paper Tubes, Cones, or Dresser Spools.

SINGLE SLUB DYED COLORS AND MIXTURES

Fancy, Black and Gray, Black and Bleached White Mixtures, and Jaspers.

Delivered in same forms as Single Gray.

TWO OR MORE PLY SLUB DYED COLORS AND MIXTURES

Fancy, Black and Gray, and Black and Bleached Mixtures, Jaspers, Double, and Twist.

Delivered in same forms as Two Ply Gray yarns.

SINGLE KNITTING YARNS

Gray, Black and Gray, and Black and Bleached Mixtures, Astrachan, and Boucle.

Delivered in the same form as Single Gray already enumerated.

WORSTED YARN DEPARTMENT

TWO OR MORE PLY KNITTING YARNS

Same as above and in addition thereto Floss, Saxony, Spanish, and Germantown.

Delivered in the Gray in Skeins.

SINGLE TURKEY MOHAIR

Gray, Flyer Spun.

Delivered on Spinning Bobbins or Paper Tubes.

TWO OR MORE PLY TURKEY MOHAIR

Gray, Flyer Spun.

Delivered in Skeins, on Spools and Dresser Spools.

FRENCH SYSTEM SPINNING

SINGLE

Gray, Jasper, Silver, Blue, and Light Fancy Mixtures.

Delivered on Cops and Cones for Knitting.

Gray Warp and Filling Yarns.

Delivered on Cops, Cones, Spools, and Dresser Spools.

TWO OR MORE PLY

Gray.

Delivered in Skeins, on Spools, Quiller Bobbins, and Dresser Spools.

The Arlington Mills worsted yarns are used by manufacturers of all descriptions of men's wear goods, women's and children's dress goods, women's and children's underwear and hose, upholstery, plushes, sweaters, braids, and trimmings.

The fancy colored yarns for men's wear goods spun by the Arlington Mills enjoy deservedly a reputation unsurpassed by those of any other American or European manufacturers. Yarns are delivered in skeins or on dresser spools, five-inch

WORSTED YARN DEPARTMENT

spools, spinning bobbins, quiller bobbins, cones, tubes, beams, or in any other form required by the purchasers. Customers have the security of knowing that the yarns which they are buying are of standard grades, and that the wool used to produce one quality of yarn is the same from one year to another. There is no need of continual sampling to test and verify the quality, and reorders are certain to bring yarns of the same even excellence.

The Arlington yarns are spun from conditioned top, so that no excess of moisture is present, and the percentage of pure olive oil used is uniform and as low as is consistent with the best results. The immense volume of production of the Arlington Mills is of itself a guarantee of sustained perfection of quality, and this immense volume permits of larger and prompter deliveries when these are desired than small mills could possibly supply. A new worsted yarn mill in the Arlington group will increase by fifty per cent the already huge capacity of the establishment.

Just as the Arlington Mills make not only all the worsted yarn required for their looms, but a very great amount of yarn for sale to other manufacturers, so they also make all the worsted tops required for their spindles, and have a quantity besides, which is marketed through the Worsted Yarn Department of William Whitman & Company. From the immense top mill of the Arlington Mills a vast product is distributed of these tops, that convenient and valuable form of semi-manufactured wool, well described as "the earliest stage in which wool can

be traded in, as corn or cotton are traded in, with any certainty of uniformity in the article."

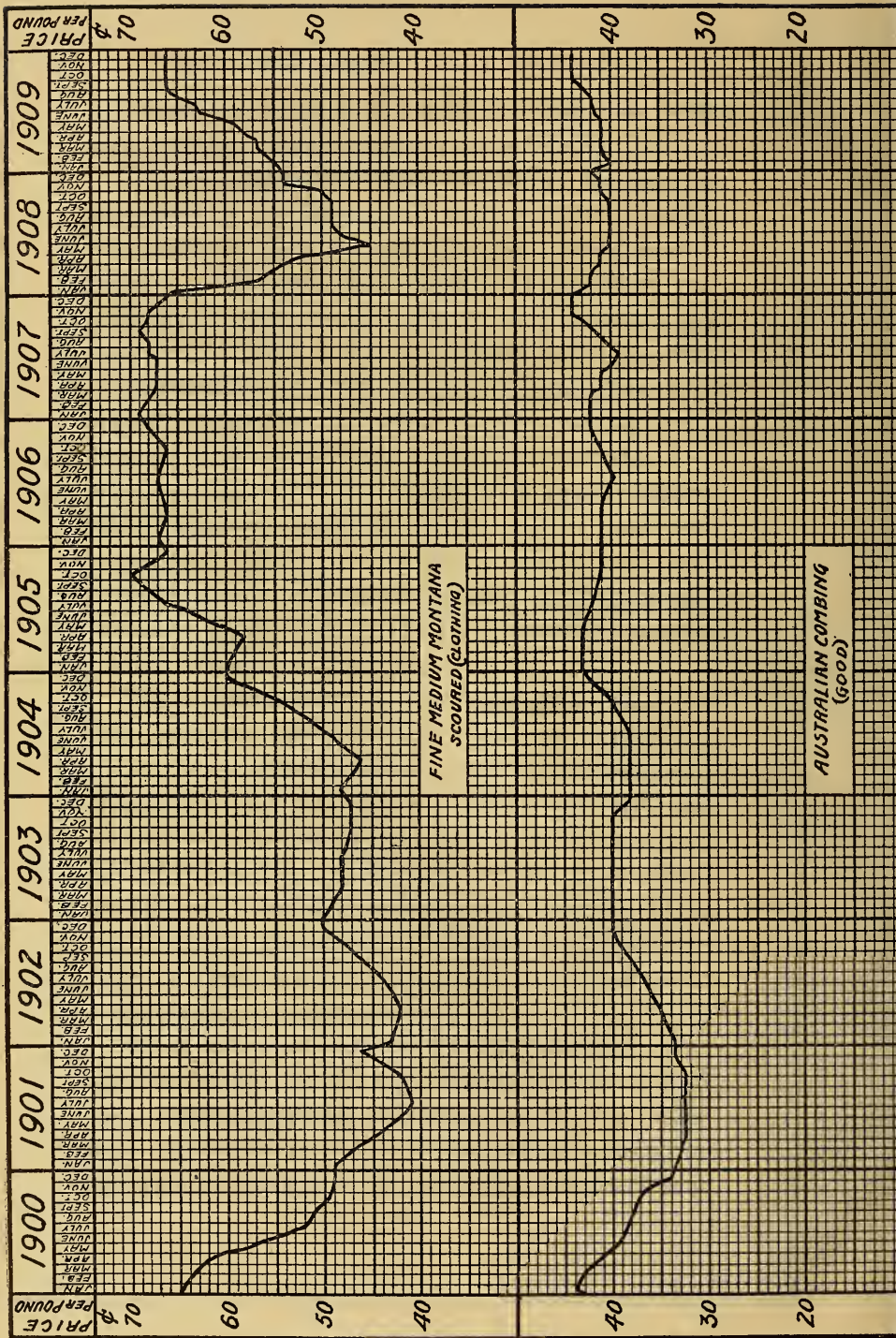
The Arlington Mills were the first in America to recognize in any large, bold way the importance of this particular form of specialization in wool manufacture. This was as far back as 1894, when the industry in the United States was about to go temporarily upon a free wool basis and there was no certainty as to the amount of protection that would eventually be given to the manufacturer. It was in an exceedingly dark and troublous era, when courage was a rare quality, that the Arlington Mills began the evolution of the present great and prosperous production of tops, which has been brought now to a basis of scientific uniformity and precision unexcelled in the most ancient seats of textile industry in Europe.

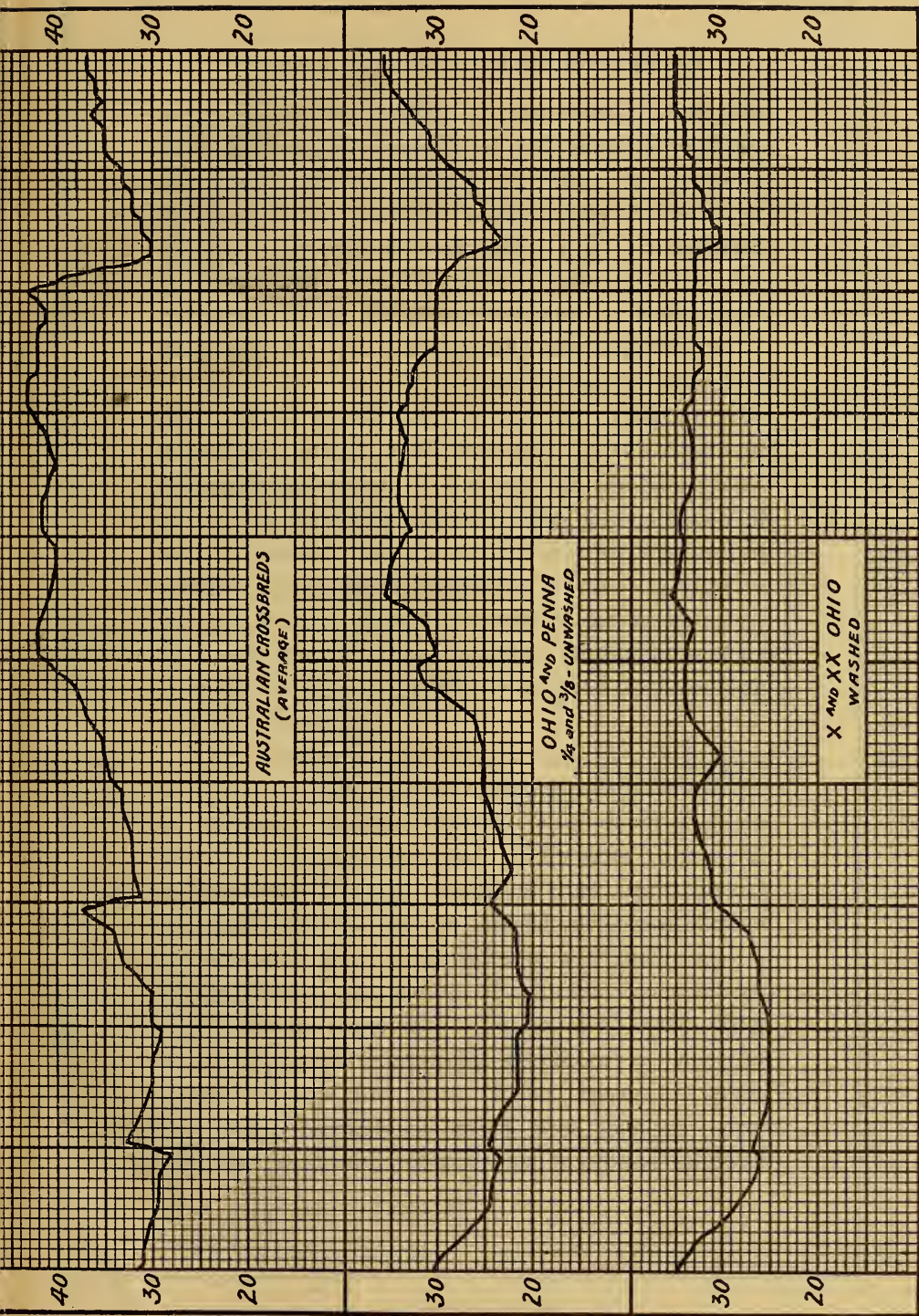
The achievements of the Arlington Mills in this direction are two-fold—first, in developing a superior process for the thorough and economical cleansing of the wool to be combed into tops, and second, in establishing the present sound, practical, equitable basis on which tops are sold in America. In both of these undertakings the Arlington Mills have been the unquestioned pioneers, and the advantages of these notable achievements are now made available to all their customers.

All of the wool combed by the Arlington management, either for the tops that are to be utilized for its own spinning purposes, or for the other tops that are to be sold to other manufacturers, or the wool of dealers or of other manufacturers sent



MARKET PRICES OF RAW WOOL, 1900-1910
(Compiled from reports of actual sales in the Boston market)





MARKET PRICES OF RAW WOOL, 1900-1910
 (Compiled from reports of actual sales in the Boston market)

to the mills for combing on commission — all this wool secures the benefits of the famous naphtha solvent process of cleansing, by which the grease is removed from the wool without any necessity of washing with soap or chemicals. This is a patented process, owned and installed exclusively by the Arlington Mills, the perfected result of many years of skilled and exhaustive testing and experiment.

Under this process the raw, unwashed wool, full not only of grease but of dirt, is subjected in a thoroughly safe and effective way to the action of the naphtha solvent. This removes the true grease of the wool, leaving, however, the natural alkali of the wool, which forms a natural soap with a base of potash. Then the application of warm — not hot — water suffices to cleanse the wool of dirt and to produce a fibre with all its impurities eliminated and its strength unimpaired, perfectly adapted for combing and manufacturing.

This wonderful process, which the Arlington Mills exclusively employ, makes it possible to secure an increased amount of clean wool from a given quantity of unwashed wool. The fibre comes out in better and stronger condition than from the old processes, the cost of commercial soaps and alkalies is dispensed with, and there is a further considerable gain in the saving of valuable by-products, which can be marketed. The wool cleansed under these improved conditions produces a superior quality of top and yarn, softer, easier to work, and more desirable in every way than the product of the crude, old-fashioned methods followed

even now by many manufacturers in America and Europe.

Eternal vigilance is the price of successful, modern textile manufacturing. The Arlington Mills have led the way in another important new departure — the study and investigation of the hygroscopic qualities of wool, so indispensable to the fixing of a proper standard for the buying and selling of tops. One peculiar characteristic of the wool fibre is that it is capable of absorbing a large quantity of water without a perceptible change of appearance. This moisture enters the minute spaces between the cells of the fibre and even permeates the substance of which these cells are composed. Wool exposed to damp air will absorb in a short time from 10 to 20 per cent of additional moisture and, of course, increase in weight by that amount.

Fifteen years ago Mr. William D. Hartshorne, then the superintendent of the worsted department and now the agent of the Arlington Mills, conducted some interesting and exact experiments of great scientific interest, which showed that the moisture in a skein of worsted yarn varied from a little over 7 per cent to 35 per cent of its entire weight in the course of a year, and, indeed, often from 15 to 20 per cent in twenty-four hours. Mr. Hartshorne, who is to-day recognized as the foremost authority in the United States on the hygroscopic properties of yarns and fabrics and on atmospheric conditions in textile manufacturing, conducted an elaborate series of calculations, most precisely carried out, and determined the substantial accuracy of the allowance

made by the Arlington Mills, and now accepted by other manufacturers, of 15 per cent for what is called "regain" from bone-dry in the sale of tops, a standard that gives authority and permanency to an important division of the textile trade. The Arlington Mills and Mr. Hartshorne in this undertaking have rendered a large and enduring service to the entire industry. Here is a signal example of the way in which, in our modern age, science is made to contribute to the evolution of business and the diffusion of prosperity.

All of the great and advanced facilities of the Arlington Mills are placed at the disposal of wool dealers and manufacturers who send their wool to the mills for combing on commission. They are allowed all of the advantages of the naphtha solvent process, which yields to them a larger amount of top from a given amount of wool than can be procured by any other process—and not only a larger amount of top, but top in better condition for successful drawing and spinning.

This commission combing has become a large and constantly increasing factor in the business of the Arlington Mills. Any combing wool, including the grades used in the manufacture of carpet yarns, may be shipped to the mills, where it will be sorted, cleansed by the patent solvent process, and carded and combed with the same scrupulous care and high efficiency and economy that characterize the preparation of the Arlington wools. These facilities, possible only in a very great establishment, are offered to worsted spinners and dealers throughout

WORSTED YARN DEPARTMENT

the country. When wool is combed on commission the resultant products, including top, noils, and wastes, are returned to the owner. Such a low charge is made for this work that it is often more economical for manufacturers to send their wool to be combed as they require it than to install their own combing machinery.

It is usually estimated that of the total cost of a worsted spinning plant, at least three-fifths represents the machinery requisite for the preliminary processes of preparing the wool for the spinning frame itself. The spinner who regularly utilizes the advantages of a great central combing plant like that of the Arlington Mills saves the fixed charges upon a very large investment in machinery and the cost of a long holding of his raw materials.



THE WORLD'S COTTON MILLS

(According to latest known estimates)

COUNTRY	Mills	Spindles	Looms	Consumption Bales	Hands Employed
Gt. Britain 1909	1977	57,026,422	739,382	3,426,000	620,000
U. S. North 1908	1067	17,543,752	†340,682	2,371,200	†197,137
U. S. South 1909	727	10,370,333	214,716	2,573,524	†121,000
Germany 1909	372	10,162,872	†230,200	1,979,958	375,000
Russia 1909	94	6,700,000	†154,577	1,495,000	350,000
Poland 1909	43	1,249,497	*12,000	300,000	*35,000
Finland, etc. 1909	13	424,982	—	46,000	—
France 1908	430	6,731,316	110,000	890,000	95,000
Austria 1908	139	4,412,072	†144,000	860,000	127,000
Hungary 1905	17	250,000	4,815	48,000	8,000
Switzerland 1909	68	1,491,531	19,594	117,000	19,000
Italy 1909	495	4,500,000	†120,000	700,000	132,000
Spain 1909	257	1,800,000	55,000	330,000	70,000
Portugal 1909	35	450,000	8,000	80,000	25,000
Belgium 1909	46	1,200,000	†24,000	160,000	15,000
Holland 1909	50	464,890	29,860	77,000	26,000
Sweden 1909	35	420,000	11,000	90,000	—
Norway 1909	12	86,576	2,329	17,000	2,625
Denmark 1909	5	77,644	—	25,000	1,000
Rumania 1899	—	40,000	—	—	—
Turkey 1908	13	100,000	—	26,000	—
Greece 1906	—	97,000	2,100	15,000	—
Egypt 1908	2	36,000	506	3,000	600
Asia Minor 1909	5	130,000	—	25,000	—
India 1908	241	5,756,020	67,920	1,991,500	221,915
China 1907	28	750,000	2,200	200,000	—
Japan 1908	82	1,695,879	9,626	1,124,787	76,566
Indo-China 1905	4	64,000	—	—	—
Philippines 1905	1	7,420	222	2,000	230
Brazil 1908	110	1,300,000	†26,928	375,000	—
Argentina 1906	2	10,000	3,250	—	—
Peru 1904	7	—	1,355	—	—
Colombia 1908	1	6,116	104	800	160
Mexico 1908	142	693,842	23,507	160,000	33,131
Canada 1908	29	855,293	19,265	125,000	10,214
TOTAL (estimated)	6,549	136,903,457	2,377,138	19,633,769	2,561,578

† Incomplete

* Previous Returns

Comtelburo Limited, of London, furnishes this compilation.

MANOMET MILLS

*Incorporated in 1903, under the laws of the
Commonwealth of Massachusetts*

CAPITAL STOCK, \$2,000,000

President's Office 78 CHAUNCY ST., BOSTON

Treasurer's Office and Mills NEW BEDFORD, MASSACHUSETTS

OFFICERS

WILLIAM WHITMAN *President*

ARNOLD C. GARDNER *Treasurer*

DIRECTORS

WILLIAM F. DRAPER

CHARLES W. LEONARD

ARNOLD C. GARDNER

GEORGE E. KUNHARDT

HENDRICKS H. WHITMAN

GEORGE M. WHITIN

WILLIAM WHITMAN

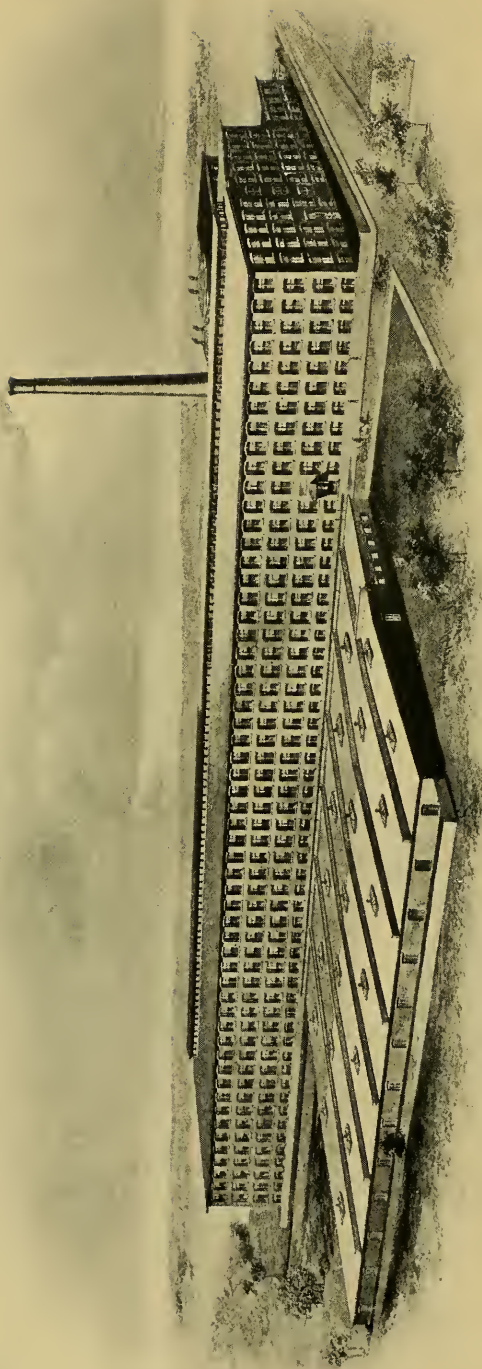
Clerk of the Corporation

J. EARLE PARKER

Resident Agent

JESSE A. KNIGHT





MANOMET MILLS,
NEW BEDFORD, MASS.

THE FIRST MANOMET MILL, 1906

COTTON YARN DEPARTMENT

THE varied products handled by the Cotton Yarn Department of William Whitman & Company fall naturally, on a basis alike of geography and character, into two classes — Northern Yarns and Southern Yarns. The total range of these cotton yarns is exceptionally broad, covering practically every kind, number, and quality of cotton yarn commercially used in the United States. In view of this wide range of products, the Cotton Yarn Department has been skilfully organized, so that the different yarns, though many in number, do not conflict with each other. The sound, underlying principle upon which the business of the firm has been established is here, as elsewhere, inflexibly adhered to. Each mill produces only a certain group of specialties for which it is particularly fitted. There is no duplication of product, no competition and conflict of the output of one mill with the output of another. The different products supplement each other all along the line.

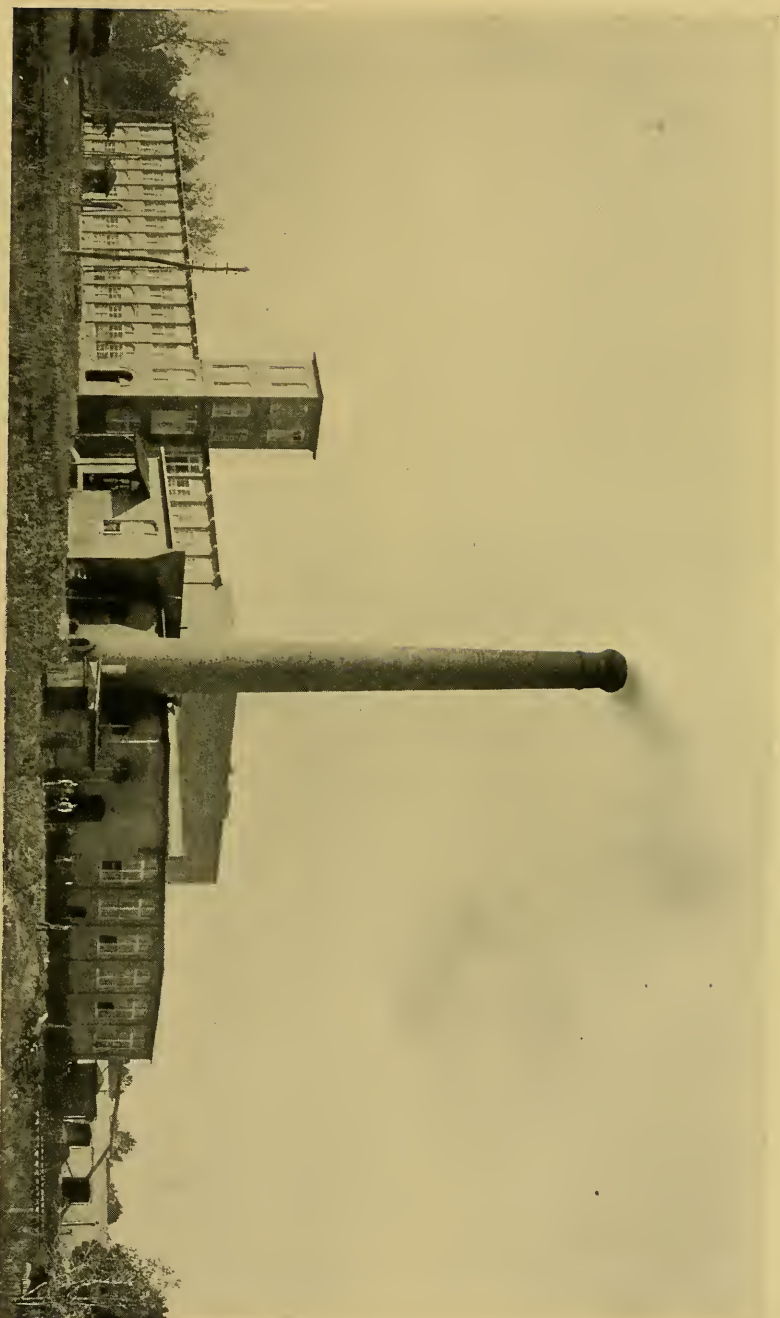
In describing the different Northern Yarns and Southern Yarns, we will follow the natural order of the processes involved in their manufacture. The simplest forms of yarn will be mentioned first, yarns that require a little more skill and further processes in their manufacture will be mentioned next, and so on.

Southern Yarns are the simplest in the point of

COTTON YARN DEPARTMENT

manufacture. These yarns are made principally of American cotton and for the most part are carded yarns. The carding process is an elementary process required in all yarns. There is an infinite variety of uses for these carded yarns, which are cheaper than combed yarns. They are made not only into ordinary cotton cloth, but into carpets, rugs, hammocks, rope and twine, and window cords. They are utilized for the insulation of electrical cables and for the covering of fire hose. These carded yarns are used in enormous quantities, and to meet this broad and steady demand the firm does an extensive business in carded yarns from the Southern cotton mills. The yarn mills of the South, as a rule, are comparatively small in size, confining themselves usually to a few numbers, and sometimes to only one. William Whitman & Company market the entire product of some of these mills, but in addition act as dealers, purchasing large quantities of yarn outright from the spinners and distributing them through the channels of their trade to a wide range of customers. It is the constant aim of the firm, in the handling of these Southern yarns, to deal only with the most skilful and responsible manufacturers, and only in such yarns as may be offered with the most implicit confidence.

The Northern Yarns include the total products of the Manomet Mills and the Nonquitt Spinning Company of New Bedford, and of the cotton spinning mill of the Arlington Mills, which manufacture certain special combed yarns in addition to the other numerous textile products already mentioned. The



HAMPTON COTTON MILLS, 1910. HAMPTON, GEORGIA
Manufacturers of Carded Hosiery Yarns averaging from 8s to 16s
William Whitman & Company, Selling Agents

COTTON YARN DEPARTMENT

Northern Yarns are all combed yarns. They are put through the carding process like all other yarns, but are subjected also to a further process of combing, which straightens the fibres, removes the short cotton, and virtually eliminates the small particles of dirt and leaf always found, to a certain extent, in yarns that have been only carded. Combed yarns require the better grades of cotton and the greater lengths of staple. They embody the highest perfection of the spinner's art.

In the manufacture of these yarns, atmospheric conditions, so important, as we have shown, in the handling and manufacture of wool, are a vital factor. In a sense, the natural moisture of the air of Lancashire made it world renowned for its cotton mills, just as the natural air of Yorkshire made it famous for its woollen and worsted factories. It is true that to-day modern processes have been so far perfected that it is possible to produce and maintain by artificial means almost any desired degree of moisture in the interior of a textile mill. There are localities, however, that are peculiarly well adapted for certain branches of textile manufacture. The city of New Bedford, Massachusetts, is one of these. Its climatic and general conditions are as well adapted for fine cotton spinning and weaving as those of any other locality in this country.

Through the Cotton Yarn Department, William Whitman & Company market all the combed yarn of the Manomet Mills and of the Nonquitt Spinning Company, located in New Bedford, on the Acushnet River. These modern mills are equipped

COTTON YARN DEPARTMENT

with every improvement for the manufacture of combed yarns from the better grades of American, Egyptian, and Sea Island cotton. The Manomet Mills produce in their No. 1 Mill the coarser counts, or yarns sizing from 8s to 20s, and in their No. 2 Mill the intermediate counts, or yarns sizing from 20s to 36s.

MANOMET MILLS COMBED YARN SPECIALTIES

MULE SPUN

Spun in numbers 8 to 26

SINGLE: Delivered on Cops, Cones, and Skeins.

Made especially for underwear and hosiery. Two qualities, designated BB and EM.

FRAME SPUN

Spun in numbers 18 to 36

SINGLE: Delivered on Cones, Tubes, Spools, and Section Beams, and in Skeins and Ball Warps.

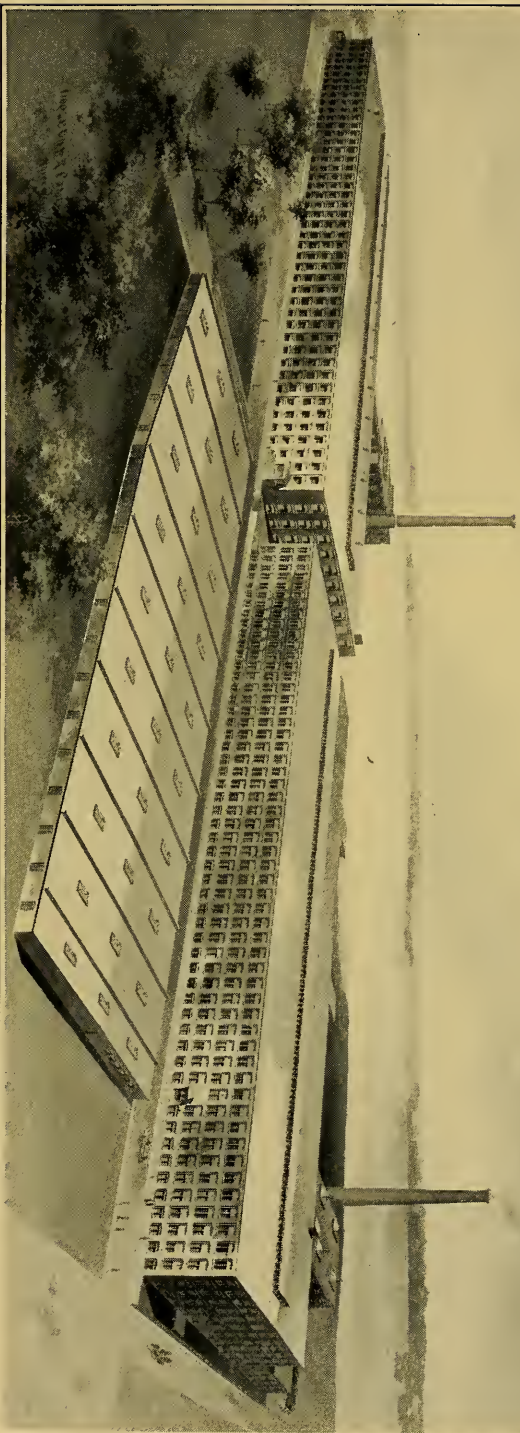
TWO OR MORE PLY: Delivered in all of the above forms.

TWO OR MORE PLY GASED: Delivered in all of the above forms.

Frame Yarns are made in three qualities, designated CC, DD, and EX.

These Frame Spun Yarns are used in an immense variety of manufactures, some of which may be enumerated as follows:

Silk Velvets and Plushes; Cotton Velvets and Plushes;
Silk Fabrics; Men's, Women's, and Children's Underwear and Hosiery; Dress Goods; Cotton and Woolen Cloths, Upholstery; Webbing, Laces, Embroideries, Braids, Electrical Work, Shoe Threads, Sewing Thread, etc., etc.



MANOMET MILLS, 1910
New Bedford, Massachusetts

COTTON YARN DEPARTMENT

The Nonquitt Spinning Company confines itself to the finer qualities, sizing from 36s to 100s, and its new mill will devote its great number of spindles to a range of finer numbers.

NONQUITT SPINNING COMPANY'S SPECIALTIES

FRAME SPUN COMBED COTTON YARNS

SINGLE, ON CONES: For Knitters.

SINGLE, IN SKEINS: For Knitters and Weavers.

SINGLE, ON SPOOLS: For Weavers, warp and weft.

SINGLE, ON SECTION BEAMS: For Weavers.

SINGLE, IN BALL WARPS: For Weavers, warp and weft.

PLY YARN, ON CONES: For Knitters.

PLY YARN, IN SKEINS: For Knitters, Weavers, and Thread Makers.

PLY YARN, ON SPOOLS: For Weavers, warp and weft.

PLY YARN, ON SECTION BEAMS: For Weavers.

PLY YARN, IN BALL WARPS: For Weavers, warp and weft.

PLY, GASSED ON CONES: For Knitters and Weavers.

PLY, GASSED IN SKEINS: For Knitters, Weavers, and Thread Makers.

PLY, GASSED IN BALL WARPS: For Weavers, warp and weft.

The above yarns are spun in all numbers from 36 to 100 in six different standard qualities, designated as SA, A, AX, E, EE, SI

There is, perhaps, a tendency toward finer goods, a tendency that grows with the development of higher and higher technical skill and more and more efficient labor in America. The factor of labor cost in these fine goods is relatively large and

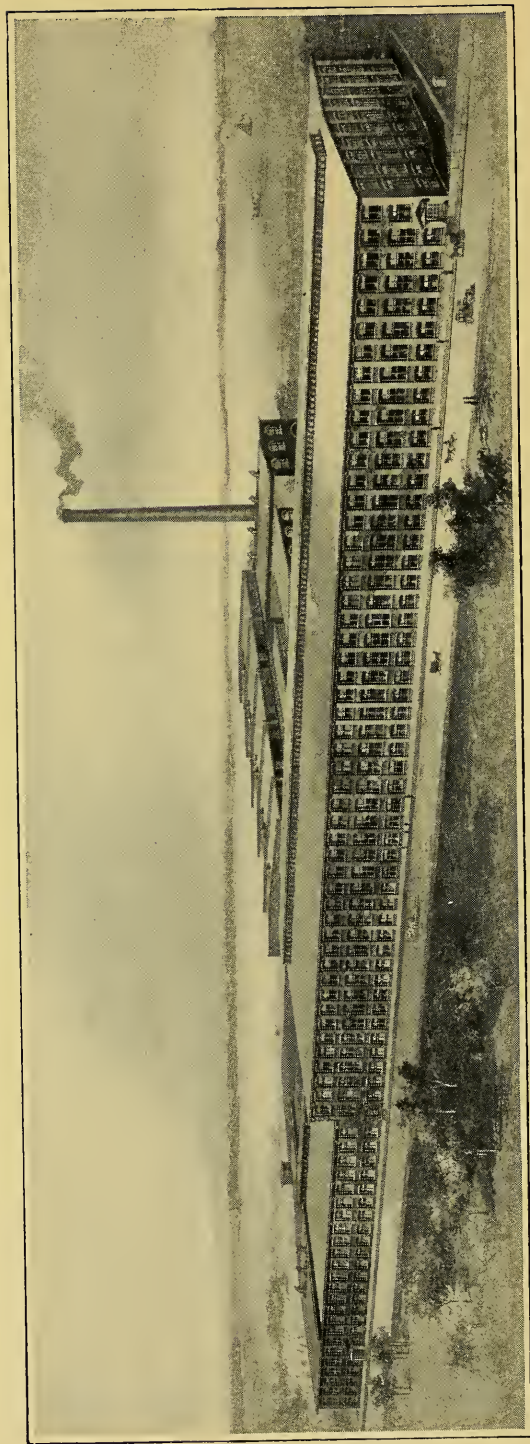
COTTON YARN DEPARTMENT

for this the protective tariff affords a needed shield.

It is the combed yarns of these famous mills that are employed in the manufacture of the higher grades of cloth, where strength and evenness of weave are indispensable. But these yarns are utilized for other things than cloth. They are wrought into the better grades of underwear, into gloves and hosiery, into tapes, braids, lace curtains, and embroideries. Great quantities of these combed yarns enter into the manufacture of the insulation of fine magnet and telephone wires. In combination with rubber they are used in elastic webbings and similar fabrics. In combination with silk they are used for velvet upholstery, umbrella coverings, linings, etc. One novel purpose which these combed yarns serve is in the manufacture of the mantles of the Welsbach burner, and another is in the weaving of the stout tires of bicycles and automobiles. In fact, if one could trace in all its different lines the cotton fibre from the field to its final use, one would be amazed at its ramifications and would well believe it to be the most useful as well as the cheapest fibre known to man.

We have considered the carded yarns of the South and the combed yarns of the North, which have been put through the carded and combing processes, and we may now consider a class of yarns which have been put through not only the carding and combing processes, but a still further process. The Arlington Mills, of Lawrence, Massachusetts, not only manufacture the finer grades of combed yarns made





THE FIRST NONQUITT MILL, 1908
New Bedford, Massachusetts

COTTON YARN DEPARTMENT

from the long staple American, Egyptian, and Sea Island cotton, but manufacture also certain special yarns which will be mentioned. Combed yarns at the Arlington Mills are bleached or dyed into colors or mercerized to meet the requirements of a little different trade. These bleached, dyed, or mercerized yarns are used for mufflers, certain kinds of underwear, the finest hosiery, etc.

Specialization has enabled each of the mills represented by William Whitman & Company to fit itself with the particular machinery best adapted for skilled and successful work in its own line. Moreover, for each mill are carefully selected the grades and varieties of cotton most fitted for its particular purpose. This specialization finally makes it possible to educate the operatives along certain definite lines. All these factors, combined with competent and progressive management, naturally secure the maximum volume of production, the most exact and efficient work, and the most uniform standard of excellence of product.

We have mentioned the specialties of the Manomet Mills of New Bedford, and of the Nonquitt Spinning Company of New Bedford. We will mention here certain specialties of the Arlington Mills. The art of mercerizing cotton yarn to give it a silky appearance has been established in this country but about twenty years. It is a comparatively new art, in which the Arlington Mills have been pioneers. These mills were among the first in America, if not the very first, to mercerize yarns successfully on a large scale for the trade. To-day

COTTON YARN DEPARTMENT

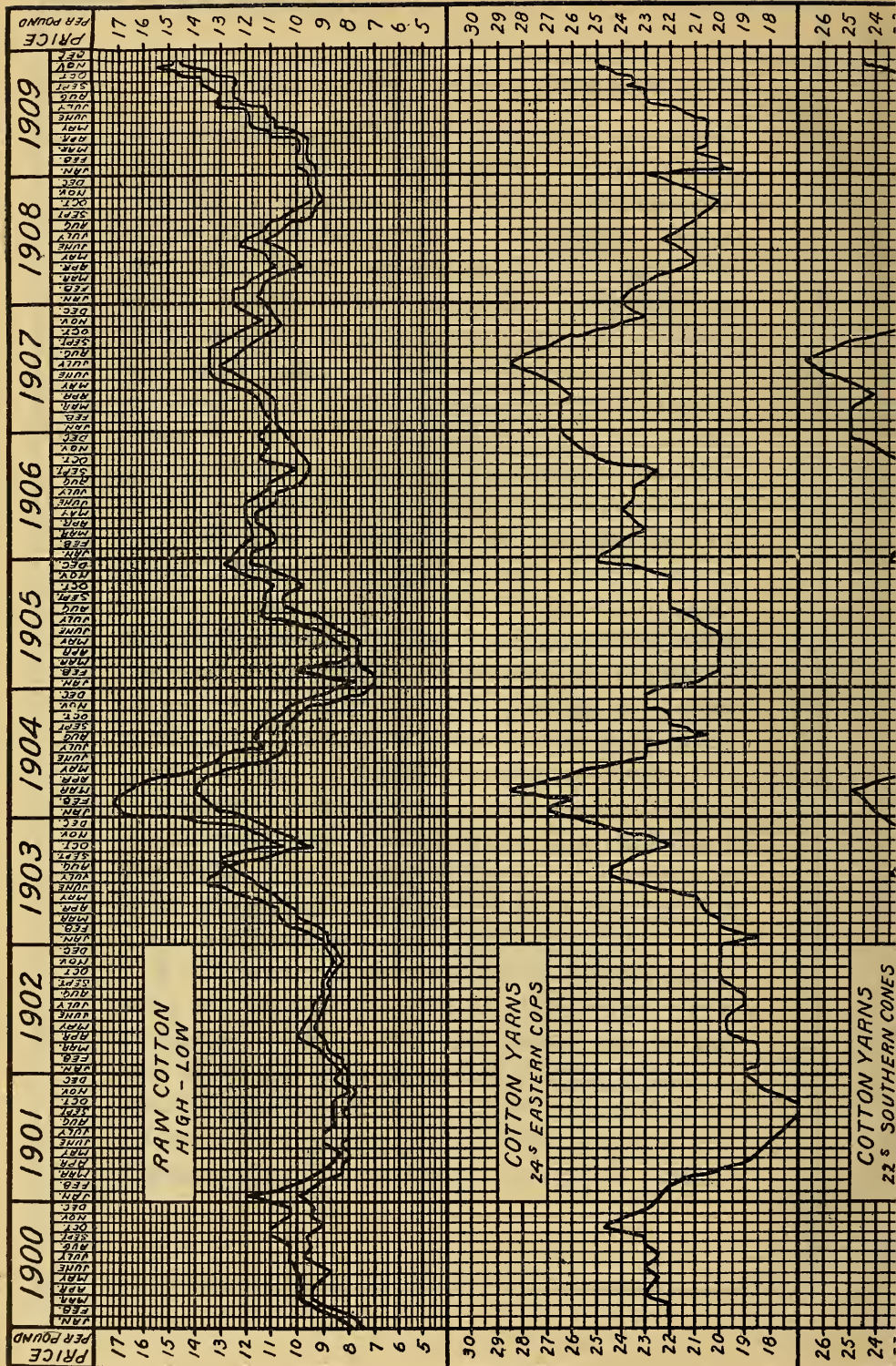
they are perhaps the largest producers of mercerized yarns in the world. Their great capacity is now overtaxed, and for this reason the mercerizing plant of the Mills is being doubled in capacity. For a time in the earlier years the use of inferior grades of cotton brought mercerized products into disrepute in the trade. The inferior yarn and cotton caused the beautiful silky lustre which the mercerizing process gives to be merely temporary or unsatisfactory. From the outset the Arlington Mills acted on the principle that mercerized yarns and fabrics should be made only from the best grades of cotton, so selected and treated as to produce the highest silkiness and lustre. Time has proved beyond a doubt the correctness of this principle. The Arlington Mills also bore the brunt of very important litigation that saved the mercerizing process for general use, instead of surrendering it as an exclusive privilege to a close monopoly. The story of this and of the mercerizing process we have embodied in a separate chapter.

It would be impossible in a brief space to describe the diverse special yarns manufactured at the Arlington Mills. To suggest to the lay mind, however, the great variety, and to specify with some exactness for the trade the different yarns, we insert a list.

To-day we are confronted with the highest general level of cotton prices since the Civil War. The temptation on the part of the spinner and on the part of the user is strong to employ cheap materials. But the Arlington Mills adhere and will continue to adhere to their previous policy of choosing the very highest grades of cotton for their mercerized yarns.



MARKET PRICES OF RAW COTTON AND COTTON YARNS, 1900-1910





MARKET PRICES OF RAW COTTON AND COTTON YARNS, 1900-1910

COTTON YARN DEPARTMENT
ARLINGTON MILLS COMBED COTTON
YARN SPECIALTIES

UNMERCERIZED YARNS

SINGLE: Bleached, delivered in skeins and on cones ;
bleached in the skein.

PLY: Bleached, delivered in skeins and on cones ; bleached
in the skein.

The above are made especially for very fine under-
wear and are *unequalled*.

MERCERIZED YARNS

SINGLE: Delivered on cones.

PLY: Delivered in warps and skeins and on cones.

MERCERIZED AND BLEACHED YARNS

PLY: Delivered in warps and skeins and on cones.

GASSED AND MERCERIZED YARNS

PLY: Delivered in warps and skeins and on cones.

GASSED, MERCERIZED, AND BLEACHED YARNS

PLY: Delivered in warps and skeins and on cones.

MERCERIZED AND COLORED YARNS

PLY: Delivered in warps and skeins and on cones.

GASSED, MERCERIZED, AND COLORED YARNS

PLY: Delivered in warps and skeins and on cones.

These are made in four different qualities, designated AM, XL, CE, XA, from Special Blends, Long Stapled American, Egyptian, and Sea Island Cotton.

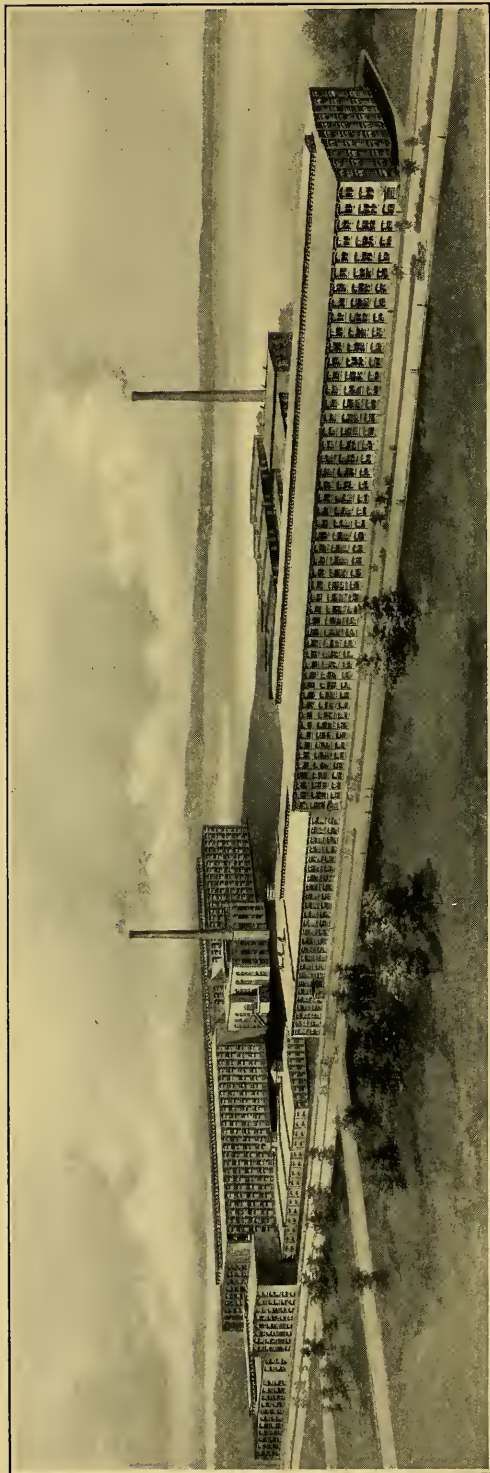
They are used in the manufacture of high grade woven fabrics — men's, women's, and children's underwear and hose ; also for thread, braids, trimmings, laces, and embroideries.

COTTON YARN DEPARTMENT

Arlington Mills Mercerized Yarns are used as substitutes for silk because of their brilliant lustre.

With these bleached, colored, and mercerized yarns of the Arlington Mills, with the combed yarns of the Manomet Mills, ranging in number from 8s to 36s, with the fine combed yarns of the Nonquitt Spinning Company, ranging from 36s to 100s, and even higher numbers, with the carded yarns of the South in all numbers in which carded yarns are made, the Cotton Yarn Department of William Whitman & Company is equipped to offer in quantity the yarns that are used for almost every manufacturing purpose throughout the United States. Furthermore, the firm is prepared to offer each special kind and quality of yarn as the product of a leading specialist in that yarn, and to offer all the various yarns in the different forms required by the different users. All of the mills are equipped to supply yarns in either the single or the twisted forms, and put up in any of the ways desired by the trade; in skeins, cones, warps, spools, etc., made from all different grades of cotton. It is the supplementing of special yarns into one broad range that makes this possible. It is the policy of the firm in requiring each mill to make a product that does not conflict with, but is in addition to, the product of another mill that has brought the firm the ability to offer all yarns for all trades.





MILL No. 2

NONQUITT SPINNING COMPANY, 1910
New Bedford, Massachusetts

MILL No. 1

NONQUITT SPINNING COMPANY

*Incorporated in 1906, under the laws of the
Commonwealth of Massachusetts*

CAPITAL STOCK, \$2,400,000

President's Office 78 CHAUNCY ST., BOSTON

Treasurer's Office and Mills, NEW BEDFORD, MASSACHUSETTS

OFFICERS

WILLIAM WHITMAN *President*

LEONARD C. LAPHAM *Treasurer*

DIRECTORS

ARTHUR T. BRADLEE

MALCOLM CAMPBELL

WILLIAM F. DRAPER

GEORGE E. KUNHARDT

LEONARD C. LAPHAM

CHARLES W. LEONARD

RICHARD S. RUSSELL

GEORGE M. WHITIN

WILLIAM WHITMAN

Clerk of the Corporation

J. EARLE PARKER

Resident Agent

ANDREW J. CURRIER

THE EDDYSTONE MFG. CO.

*Incorporated in 1895, under the laws of the
Commonwealth of Pennsylvania*

CAPITAL STOCK, \$1,000,000

*Executive Offices . 1011 PENNSYLVANIA BUILDING
PHILADELPHIA, PENN.
Works EDDYSTONE, PENN.*

OFFICERS

W. P. SIMPSON	<i>President</i>
E. K. NELSON	<i>Vice-President</i>
W. P. SIMPSON	<i>Treasurer</i>
W. F. KEENAN	<i>Secretary</i>

DIRECTORS

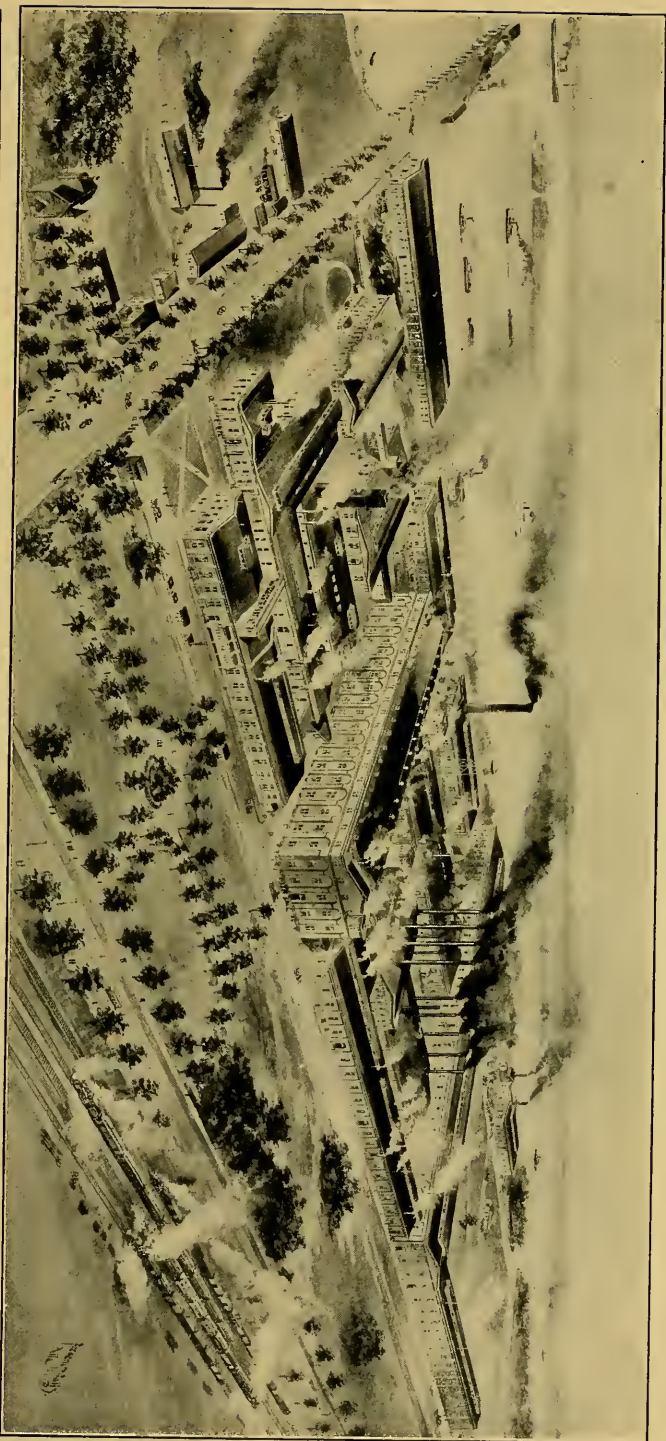
W. P. SIMPSON
E. K. NELSON

T. E. FRAME

W. F. KEENAN
S. B. BROWN



ESTABLISHED 1842



THE EDDYSTONE MANUFACTURING COMPANY, EDDYSTONE, PENNSYLVANIA

Successor to Wm. Simpson & Sons

Sole Manufacturer of Simpson-Eddystone Fabrics

1842-1910

PRINTED GOODS DEPARTMENT

THE Eddystone Manufacturing Company, successor to Wm. Simpson & Sons and the sole manufacturer of Simpson-Eddystone fabrics, markets its output through this department of the firm of William Whitman & Company.

Three generations of Simpsons have made Simpson-Eddystone Prints, and three generations of consumers have used Simpson-Eddystone Prints.

William Simpson, Sr., the founder of this business, began his career as a manufacturer in 1836 by block printing silk handkerchiefs. He started Calico printing in 1842.

The art of Calico printing is "as old as the hills" and its history proves it to be of similar stability. The output and use of printed cottons has greatly increased from ancient to modern days, at times increasing by leaps and bounds, and the ratio of consumption of this useful fabric bids fair to grow in future among the nations of the earth.

The following is a part of a graphic treatise that appeared in 1883 on the subject of Calico printing, compiled by Messrs. George Ripley and Charles A. Dana :

CALICO PRINTING

"The term calico (from Calicut on the Malabar Coast, whence it was first imported) is applied in England to white or unprinted cotton cloth, but in the United States to cotton cloth upon which colored patterns are impressed

with the use of dyes, technically called prints. The effect produced by the printing process is like that of the colored designs brought out by the loom, but with much greater economy of time and labor.

The origin of this art, like that of dyeing, is traced back to very remote antiquity, and in some form or other appears to have been practised by nations of little skill in other respects. The aborigines of northern America stain their garments of different colors, which is a rude method of calico printing; while the natives of Mexico, at the time of its conquest by Cortes, produced garments of cotton adorned with figures in black, blue, red, yellow, and green colors.

Pliny's account of the process practised by the ancient Egyptians is particularly interesting for showing the skill attained by them in the art, as also for describing with great conciseness the principle of the common operations :

‘They take white cloths, and apply to them, not colors, but certain drugs which have the power of absorbing or drinking in color; and in the cloth so operated on there is not the smallest appearance of any dye or tincture. These cloths are then put into a caldron of some coloring matter, scalding hot, and after having remained a time are withdrawn, all stained and painted in various hues. This is indeed a wonderful process, seeing that there is in the said caldron only one kind of coloring material; yet from it the cloth acquires this and that color, and the boiling liquor itself also changes according to the quality and nature of the dye-absorbing drugs which were at first laid on the white cloth, and these stains or colors are, moreover, so firmly fixed as to be incapable of removal by washing. If the scalding liquor were composed of various tinctures and colors, it would doubtless have confounded them all in one on the cloth; but here one liquor gives a variety of colors according to the drugs previously applied. The colors of the cloths thus prepared are always more firm and durable than if the cloths were not dipped into the boiling caldron.’

PRINTED GOODS DEPARTMENT

In the different countries of India the art is practised with various degrees of skill. In some the patterns are drawn with a pencil upon the fabric; while in Mesopotamia, as stated by Mr. Buckingham, blocks are employed for producing an impression, as practised by the English block-printers. The Chinese have long used the same process. The large chintz counterpanes, called palampoods, of an ancient East India fabric, are prepared by placing on the cloth a pattern of wax and dyeing the parts not so protected. From India it appears the art was introduced at an early period into Europe; but it never became of much importance till some time in the 17th century, when Augsburg became celebrated for its printed cottons and linens. From this time the art spread into France, Germany, Switzerland, and Great Britain, being introduced into London about the year 1676. Here, being greatly restricted by the opposition of the silk and woollen weavers, it made but slow progress.

In 1720 the wearing of printed calico was prohibited by act of parliament, under a penalty of £5 for each offence on the part of the wearer and of £20 on that of the seller.

In 1730 it was allowed to be printed, provided the warp was of linen and the weft only of cotton; but even then it was subject to an onerous tax of 6d per square yard.

In 1774 the restriction upon the manufacture was repealed; but a tax of 3d per yard was continued, which was increased in 1806 to 3-1/2d.

In 1831 this duty was repealed; and the art, which had sustained itself under all the attempts to keep it down, now that it was relieved of the burden of paying an average of 50 per cent. on the goods produced for home consumption, suddenly received a great impetus, so that in place of 8,300,000 pieces of goods manufactured in 1830, the production was increased within 20 years to about 20,000,000. The character of the goods was greatly improved, as well as the processes and machinery; while the cost of production was much reduced by the enormous quantities manu-

PRINTED GOODS DEPARTMENT

factured. The process of printing had been by wooden blocks, each one of which of a few inches square was applied by hand, impressing a portion of the figure upon the surface in a single color, and another block subsequently applied in the same spot to fill in another portion of the figure in another color. This process was soon nearly superseded by immense machines constructed with the greatest ingenuity, capable of producing 15 or even 20 colors at once with the same precision as in the case of the simpler machines which printed only two or three colors at once, while at the same time 600 or 700 times as many pieces were produced per day as if they had been blocked separately with the same number of workmen employed.

The art has been perfected by the highest chemical talent, as well as by the ingenuity of the mechanician and the taste of the artist. Artists or pattern designers are especially employed, whose constant occupation is to furnish new patterns; from which the printer selects those he judges most likely to be popular. The French artists are admitted to produce finer designs than the English, while the latter nation claims a superiority in the mechanical departments of calico printing."

During the twenty-six years elapsing since the above treatise appeared, giant strides have been made in the calico printing industry. Immense and costly printing establishments have been built and equipped in all civilized countries. To-day hundreds of thousands of men, women, and children are engaged in producing calico, and its consumers are numbered by millions.

Engineers and inventors of renown have devoted their energies to the improvement of old and the creation of new machinery. The coloring and finishing of cotton fabrics has been completely revolutionized.

PRINTED GOODS DEPARTMENT



The Eddystone Manufacturing Company's constant experience and practice during sixty-seven years embraces the most remarkable period of progress and development in the entire history of calico printing. In age, experience, organization, perfection of equipment and actual accomplishment it stands first in its chosen field in this country, and its staple and novelty lines have earned an honored and enviable reputation.

Artists, chemists, and engineers have successfully striven to beautify and improve the Simpson-Eddystone products. Many dress goods designers capable of producing exquisite patterns especially adapted for Simpson-Eddystone fabrics form part of the regular organization. The complete revolution in the source of textile coloring matter, whereby the old vegetable colors were replaced by the superior coal tar colors, has been of great value in Simpson-Eddystone fast color combinations.

The Eddystone Manufacturing Company's laboratory has evolved improved processes and methods for treating and manipulating prints, and has trained specialists known as "Colorists" to combine and blend colors in a striking and effective manner. The development of the art of mercerizing (silk finishing cotton fabrics) has been adopted and applied to the finish of certain Simpson-Eddystone lines.

Simpson-Eddystone quality to-day is the condensed result of sixty-seven years of invaluable cumulative experience of the Simpson family, whose members for

PRINTED GOODS DEPARTMENT

three successive generations have successfully devoted themselves to the task of improving the product bearing their name.

In addition to the celebrated, long established, and well known staple lines of absolutely fast color prints, known as Simpson-Eddystone *Solid Blacks*, *Silver Grays*, *Black and Whites*, and *Shepherd Plaids*, numerous other lines have been produced noted for their striking novelty, beauty of designs, brilliancy and fastness of color, fine fabric and finish.

Among the meritorious lines of to-day bearing the Simpson-Eddystone ticket are the following :

Silk Novelties embody the latest Parisian designs found only in the very finest class of goods.

Velvettes are superior to the best known lines of outing flannels, being distinguished by brightness and fastness of coloring and clearness of white.

The high grade *Silklines* and *Silk Finish Robes* made by the Company enjoy an established position and an ever increasing demand, because of their real merit. They are characterized by their rich designs, harmonious color effects, fine texture, and lustrous finish.

The unmistakable seal of public approval proves beyond question the sterling quality of Simpson-Eddystone fabrics.

The great range and variety of these fabrics and the diversity of product of The Eddystone Manufacturing Company is further illustrated by the additional lines of fabric mentioned in the following list.

PRINTED GOODS DEPARTMENT

SIMPSON-EDDYSTONE

MADEIRA CLOTH
 $\frac{3}{4}$ MADRAS PERCALES
 L I N O N S
 S I M S I L K
 QUAKER GRAYS
 DARK NOVELTIES
 ELYSIAN ART ROBES
 CAMEO BLACK & GRAYS
 MERITO $\frac{4}{4}$ PERCALES



EMPIRE SATINES
 INDIGO LIGHT BLUES
 L U M I N É
 C A R M I N I O S
 S A B E L E T T E S
 SCARLETTA CLOTH
 FAST HAZEL BROWNS
 ALL INDIGO INDINES
 CREDITA $\frac{4}{4}$ PERCALES

The Eddystone Manufacturing Company produces annually over 60,000 *miles* of staple and novelty lines, consisting of dress goods and draperies, each line requiring from *eleven* to *twenty-seven* distinct processes to perfect, and each particular process demanding careful planning and execution to produce the famous Simpson-Eddystone quality.

The name carries the ring of accomplishment and is a guarantee of high quality.

"SIMPSON-EDDYSTONE" ON PRINTS
 IS LIKE STERLING ON SILVER

NASHAWENA MILLS

*Incorporated in 1909, under the laws of the
Commonwealth of Massachusetts*

CAPITAL STOCK, \$2,500,000

President's Office 78 CHAUNCY ST., BOSTON
Treasurer's Office and Mills NEW BEDFORD, MASSACHUSETTS

OFFICERS

WILLIAM WHITMAN *President*
WILLIAM B. GARDNER *Treasurer*

DIRECTORS

GEORGE E. BULLARD	GEORGE E. KUNHARDT
I. TUCKER BURR	CHARLES W. LEONARD
WILLIAM F. DRAPER	RICHARD S. RUSSELL
ROBERT H. GARDINER	GEORGE M. WHITIN
WILLIAM B. GARDNER	MALCOLM D. WHITMAN

WILLIAM WHITMAN

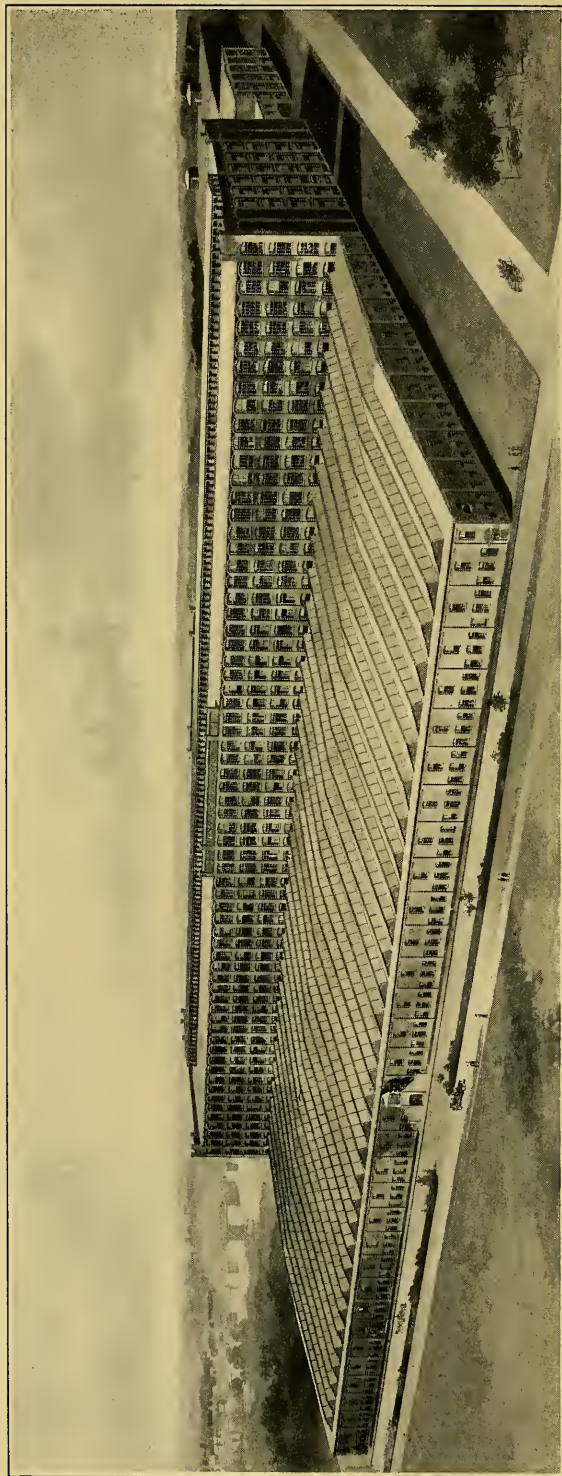
Clerk of the Corporation

J. EARLE PARKER

Superintendent

JOHN L. BURTON





NASHAWENA MILLS, 1910
Weave Shed and Spinning Mill. New Bedford, Massachusetts

GRAY GOODS DEPARTMENT

THE term "gray goods" applies generally to fabrics which have not been bleached or dyed or subjected to any process after weaving. They are sold in the condition in which they come from the looms. Certain gray goods, such as sheetings, drills, and ducks, are frequently retailed in their gray or natural state. The gray goods marketed by William Whitman & Company, however, include only those cloths that are manufactured especially for converters, who have them dyed, bleached, or printed before they reach the consumer.

Of the different products marketed by the Gray Goods Department, the varied fabrics of the Nashawena Mills deserve first mention. They will be many and great in quantity, as this mill is the largest single cotton mill ever built at one time in the United States. Primarily the Nashawena Mills were incorporated to manufacture the highest grades of fine cotton fabrics, and to attain perfection as nearly as possible in that manufacture. With this end in view no effort has been spared to have the buildings of the best construction for the proper light, and the proper atmospheric conditions, and to have installed also the best weaving machinery, the best spinning machinery, and the best means of creating power and of transmitting it evenly throughout the mill. The result is that the plant of the

GRAY GOODS DEPARTMENT

Nashawena Mills stands to-day as a model mill of its kind, equipped with every improvement known to textile science. It is new from beginning to end. It will not be handicapped in any of its operations by a single machine that is not absolutely up to date.

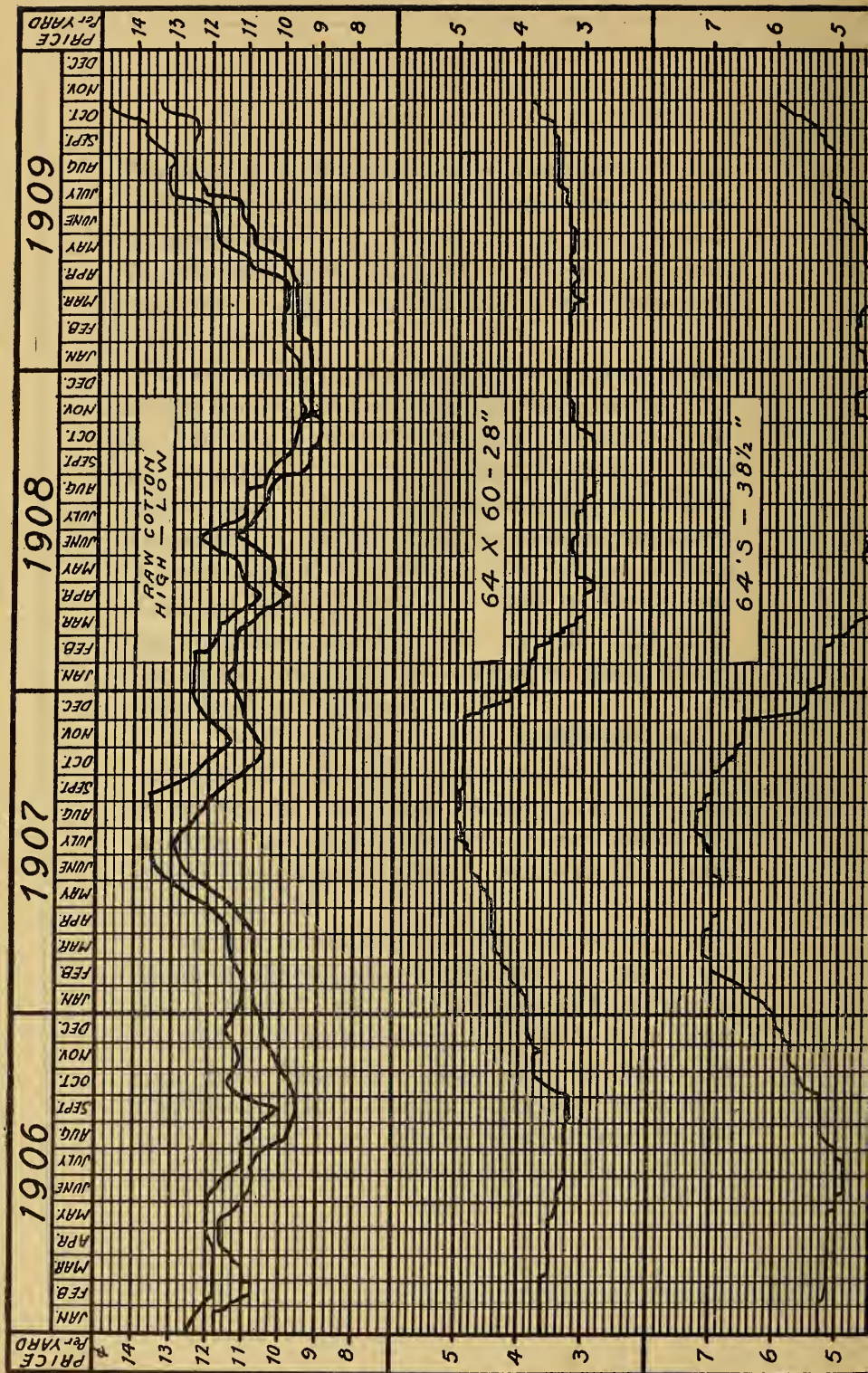
In the varied processes of the manufacture of fine cotton fabrics, the spinning of the yarns woven into the fabrics is as important in attaining a high standard of perfection as the process of weaving. The management of the Nashawena Mills has had a long experience in the art of spinning fine cotton yarns. Also the plant is in a splendid locality on the Acushnet River in the city of New Bedford, where the atmospheric conditions are as well adapted for fine cotton spinning and weaving as those of any other locality in this country.

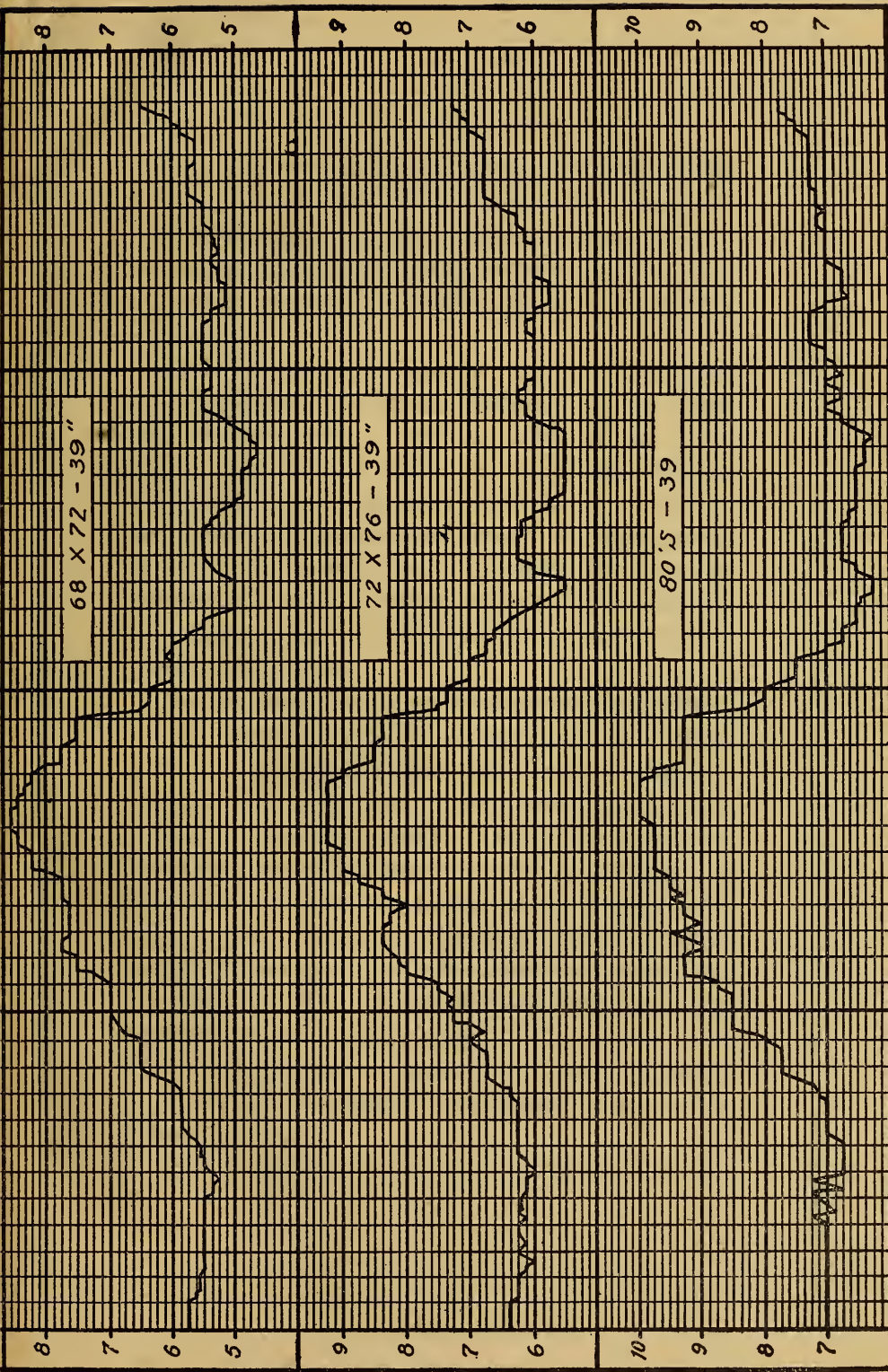
An ideal location, an ideal equipment, and a management with a long experience, not only in the art of weaving fine cotton fabrics, but in the art of spinning the yarns woven into those fabrics, are special advantages that should enable this large mill to take the lead.

The fine cotton fabrics of the Nashawena Mills comprise almost every variety that is sold in the gray or natural state to the converter. These fabrics are made in widths from 27 to 45 inches from yarns spun from long-staple American, Sea Island, or Egyptian cotton. They are specially constructed for the finish that may be required and for the various special uses to which they may be put.



MARKET PRICES OF RAW COTTON AND STAPLE COTTON FABRICS, 1906-1910





MARKET PRICES OF RAW COTTON AND STAPLE COTTON FABRICS, 1906-1910

GRAY GOODS DEPARTMENT

The Plain or Staple goods include Lawns, India Linons, Sateens, and Twills where the constructions have been adopted by the converting trade as the most suitable for their purposes. In this class of goods perfection of fabric is of the utmost importance.

The Fancy cotton goods include Venetians, DIMITIES, Fancy Checks and Stripes, Dobbies, Leno and Jacquard weaves, and all kinds of novelties. Special attention is given to mercerized fabrics, which are either mercerized after being woven or are woven from mercerized yarns. In these goods great care has to be taken in preparing the yarns so that the fabrics will retain permanently the attractive, lustrous, and silky appearance imparted by the mercerizing process.

Another important class of fabrics manufactured by the Nashawena Mills includes silk-and-cotton goods. The industry of manufacturing these goods is in its infancy in the United States, but it gives promise of a healthy growth. During the past seven years the increased demand for silk and cotton goods has been a conspicuous feature of the development of the textile industries. These fabrics, often called silk-filled goods, are made from fine-spun yarns and filaments of silk. When finished they have the appearance of all-silk goods. They wear well and are reasonable in price. For many purposes they are as serviceable and acceptable as all-silk fabrics.

As silk is such an important raw material in this

branch of the business, some description of its production may be of interest.

Silk is the product of the silkworm, which, at a certain stage of its existence, discharges two filaments in a semi-fluid condition from glands near its head. These filaments unite as they are discharged and form one thread, which hardens immediately on exposure to the atmosphere. The worm winds the thread around itself until it is entirely enveloped in what is called a cocoon, which contains on an average about a half mile of thread. Three weeks after the cocoon is finished the worm changes to a moth, forcing its way out of the cocoon by cutting or breaking some of the threads. To prevent this, every cocoon not intended for breeding purposes is placed in a steam heater to stifle the chrysalis. The filaments of silk are then in condition to be unwound from the cocoon and reeled into skeins. The skeins weigh from one to several ounces, and are packed in bundles called books, weighing from five to ten pounds. The books are then made up into bales, weighing from 100 to 160 pounds, the form in which raw silk is generally shipped for commercial use.

Most silk is in a sense cultivated. The mulberry trees on which the silkworm feeds are scientifically grown and protected, and the silkworm is carefully nurtured. Most Canton, Japanese, and Italian silks are grown under these conditions. There is, however, a considerable amount of wild silk used in the cotton and silk industry. This is known as Tussah, coming chiefly from China and having a highly





NASHAWENA MILLS, 1910
Mill Offices and Power Plant, New Bedford, Massachusetts

GRAY GOODS DEPARTMENT

lustrous aspect that adapts it particularly for use as filling for fine goods. Another silk is known as Doppioni. This is a heavy, rough silk. It happens in certain instances that two silk worms weave their cocoons together. This causes the silk or filaments of the separate cocoons to adhere at certain points, and wherever this adhesion takes place a slub or rough spot in the thread is created. This makes the Doppioni silk very uneven, and it is used to give a rough effect in cotton and silk fabrics, resembling the well-known Pongee and Rajah textures.

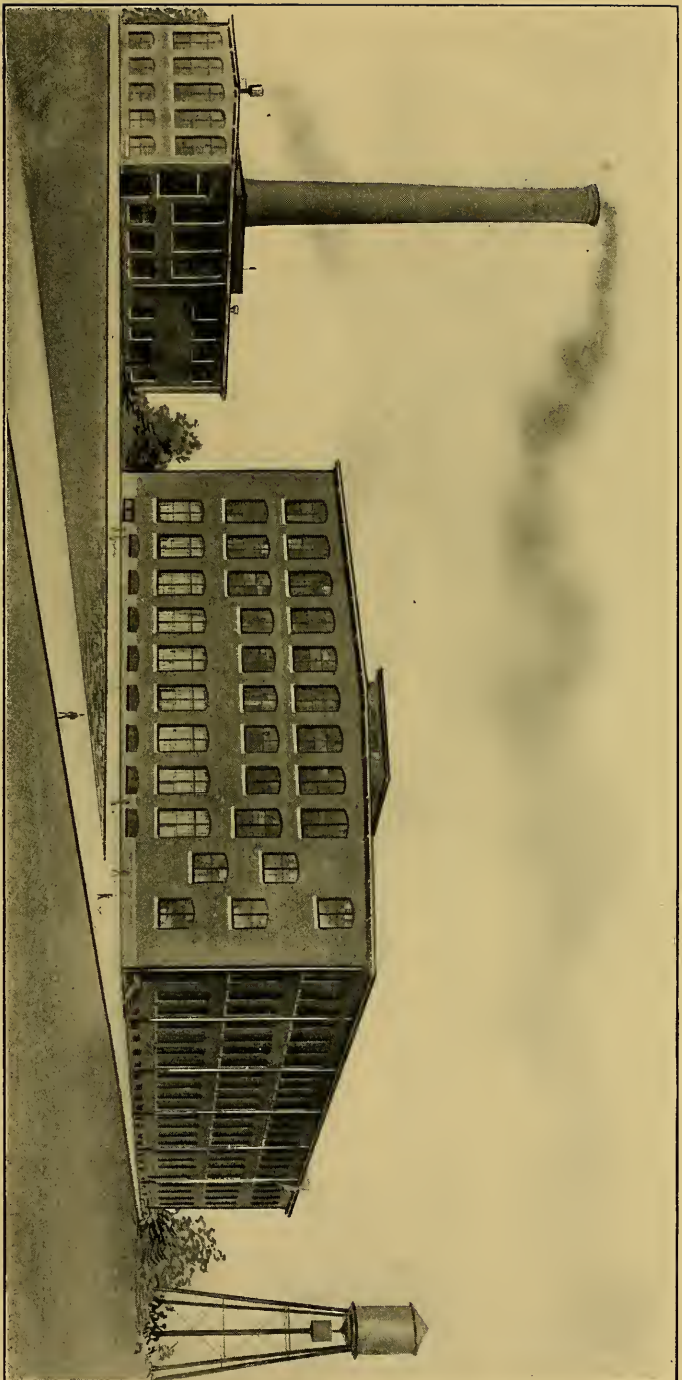
The chief sources of supply of the silks used in the cotton and silk industry are China, Japan, and Italy. In spite of many years of effort, the production of raw silk has never proved commercially successful in the United States, and practically all of the silk consumed here is imported from other countries. Therefore, the rate of progress of the silk manufacturing industry as a whole may be measured by the increase of the imports of silk, which have grown with astonishing rapidity from 1868 until the present time. The imports of raw silk for the year ending June 30, 1909, were 49 per cent greater than those for the preceding year, and the total shipments of Tussah silk from Shanghai during the year ending June 30, 1909, were nearly double those of the preceding year, and 50 per cent in excess of the yearly average from 1904 to 1907. The so-called cotton and silk industry in this country has developed a further market for the silks of the world.

GRAY GOODS DEPARTMENT

The Nashawena Mills are equipped to manufacture every variety of silk-filled goods, and will be an important factor in this new industry. All kinds of novelties and special designs will be made in these fabrics, just as they are made in the all-cotton goods already described.

A very important feature of the Nashawena business is special contract work in all the various fabrics which we have mentioned. Special fabrics are made up in accordance with the patterns of customers and confined exclusively to those customers. Attention is devoted to designing fancy patterns and novelty weaves. Special samples are made up in accordance with the suggestions of purchasers, and designs of the cloth are reserved altogether for those purchasers. Skilled designers carry out the ideas of customers in the various fabrics, and the individuality of each customer as to taste or design with regard to any specialties is preserved as far as possible.

In addition to the Nashawena fabrics the Gray Goods Department markets the entire production of the Calhoun Mills, of Calhoun Falls, South Carolina. These mills were planned to spin their own yarns from cotton grown principally in the surrounding country, and to weave these yarns into plain staple fabrics. It has been the aim of the management to specialize on one or two constructions, with the idea of perfecting their manufacture. The result is that the fabrics have proved to be of uniformly high standard, owing to the quality of the

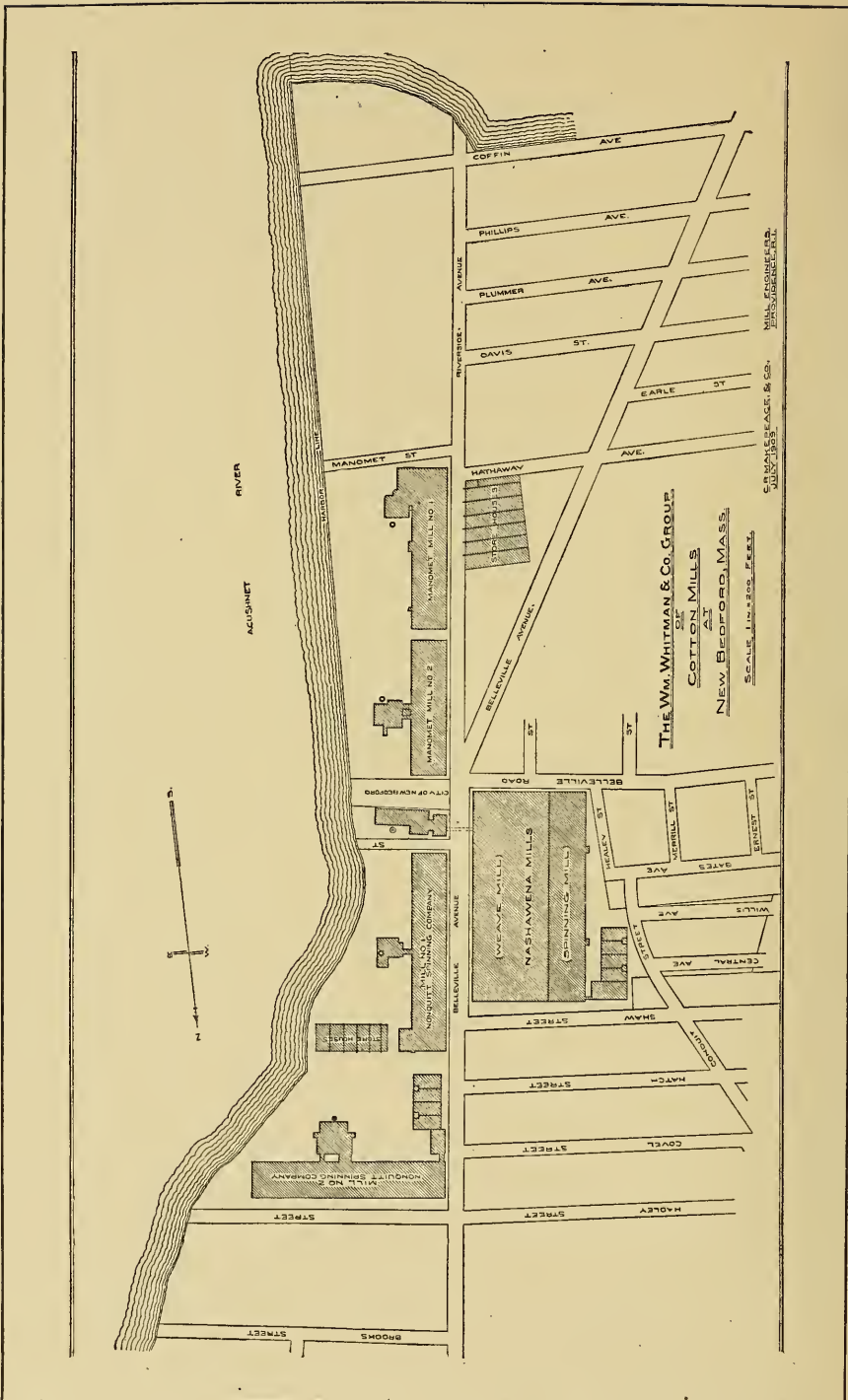


CALHOUN MILLS, 1909
Calhoun Falls, South Carolina

GRAY GOODS DEPARTMENT

yarn as well as the careful weaving. The demand for the Calhoun cloths has grown, and to meet that demand the capacity of the mills is now being increased.

These gray cloths are sold to converters, who bleach, dye, or print them into many different finished fabrics. The finished fabrics in their different forms are used for almost every kind of light cotton article.



EVOLUTION OF AMERICAN DRESS GOODS INDUSTRY

THE art of wool manufacturing, in its present varied and attractive aspects, is altogether a modern development in the United States. Up to the Civil War the industry had found only a scant and precarious foothold. Take, for example, such a fabric as bunting, used for dress goods as well as for flags, pennants, and signals—even as late as 1865 this material had scarcely been produced at all in America. As the late Dr. John L. Hayes, first Secretary of the National Association of Wool Manufacturers, said in a speech in that year, 1865, at Philadelphia :

“To our shame be it spoken, all our flags are grown, spun, woven, and dyed in England, and on the last Fourth of July the proud American ensigns, which floated over every national ship, post and fort, and every patriotic home, flaunted forth upon the breeze the industrial dependence of America on England.”

This was true not only of bunting, but of the lighter woolen fabrics in general—they were brought from Europe because it was believed that there was neither the machinery nor the technical skill to make them here. Dr. Hayes in this same address spoke of an association of patriotic ladies formed in Washington in the gloomiest days of the war, who pledged themselves to wear nothing but American fabrics, and were surprised and mortified to discover the extremely meagre range of suitable worsted dress goods of native production.

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There has been a great, significant change since then, and it may be interesting to review briefly the evolution of the dress goods industry in America. Throughout the period from 1845 to 1850, two favorite fabrics imported from France and enjoying a wide popularity in this country were mousseline delaines, 22 inches wide, and cashmeres 40 to 42 inches wide, made entirely of fine, soft wool—the delaines were produced in both solid and printed colors. Mindful of the demand for these French goods, Mr. William Courtis, an American partner in the commission house of Thornton, Firth & Company, of Bradford and Manchester, suggested to English manufacturers that they make a fabric to be known, Anglicized, as muslin delaine, in imitation of the French fabric, but having a cotton instead of worsted warp and a somewhat coarser grade of wool for the filling; in other words, a stronger, cheaper fabric, similar in general effect to the French article, but capable of being sold at a much lower price. This fabric was made in different textures for different seasons, the lighter being called barege delaines, challies, Persian delaines, or Persian cloths. These English-made fabrics in their turn gained great popularity among the women of America, and the large sales brought large profit to the transatlantic manufacturers.

Naturally, American manufacturers, though their art was at that time rather feebly developed, began to ask why they could not gain some of this profit for themselves. The honor of being the pioneer in this important undertaking belongs to John Marland

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of Ballardvale, Massachusetts, in whose mill were made the first delaines, printed or dyed, that were produced in America. The wool was combed by hand; the cloth was printed first on blocks and then on the machines of the Hamilton Manufacturing Company at Lowell. But though an ambitious and progressive manufacturer, Mr. Marland was not a wealthy one, and there was a stubborn prejudice against American-made fabrics to overcome — a prejudice that even in these later and more enlightened days has not entirely vanished. So the pioneer undertaking of Mr. Marland failed. But the effort was repeated by other manufacturing concerns with equal bravery and more abundant resources.

The Amoskeag Manufacturing Company of Manchester, New Hampshire, equipped a small mill at Hooksett with two hundred looms and began the production of delaines, which were printed at Greenwich, Rhode Island. Another and a larger establishment for the manufacture of delaines — the Manchester Mills — was meanwhile founded by stockholders of the Amoskeag Company. At first only carded wool was used, but when the combing machines succeeded the hand process in England and France they were promptly introduced in Manchester. The Hamilton Woolen Company of Southbridge, Massachusetts, which had been manufacturing men's wear, transformed its factory into a dress goods mill for the making of delaines, and in 1853 the Pacific Mills at Lawrence, Massachusetts, were organized for a similar purpose.

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These American-made dress goods soon commanded a wide market in this country. They were attractive and durable, and for many years proved to be the leading dress goods fabrics for the great majority of American purchasers. The first Morrill tariff act, produced not by the Civil War, but by the depression and distress and the loss of revenue following the disastrous "downward revision" of 1857, gave to American manufacturers a more adequate protection. This Morrill tariff, which was signed by President Buchanan on March 2, 1861, and was an avowed protective measure, designed to lessen the importation of foreign goods, levied a duty "on all delaines, cashmere delaines, muslin delaines, barege delaines, composed wholly or in part of wool, and on all other goods of similar description." Mr. William E. Webster, to whose long and intimate knowledge of the dress goods industry we are indebted for many of the facts set forth here, was then the United States appraiser of merchandise at the port of Boston. Though the phraseology of the new law was somewhat indefinite, Mr. Webster, as appraiser, construed it to include all goods made of the same materials and used for the same purposes as delaines, as goods of similar description to delaines. This fortunate interpretation, of such momentous consequence to American industry, was approved by the Secretary of the Treasury and sustained by the courts. This provision of law not only increased the Federal revenue at a most opportune time, but incidentally afforded protection and encouragement to American manufacturers in an im-

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portant art, which has now grown to splendid proportions.

But this American success has been hard won. When the English manufacturers realized that they had lost the American market for the ordinary delaines, they turned their attention to stripes and plaids made from dyed yarns, and also to a piece-dyed twilled cloth made with a cotton warp and worsted filling and known as Coburg, a clever imitation of the French worsted cashmere. These goods competed severely with the American delaines, and our manufacturers were compelled to turn their attention to the newer fabrics or surrender the market to the foreigners.

There were six exhibitors of American dress goods at the American Institute Exhibition of 1869, both the Pacific Mills and the Arlington Mills among them, and it is significant of the difficulties with which the industry was even then contending that of the other four exhibitors three subsequently failed. There were not only delaines, but serges, reps, poplins, and Coburgs in these exhibits, but not a piece of men's wear worsteds or white goods. No white goods had been made here prior to 1869, but the development of the white goods and men's wear worsted industry began simultaneously in the year following. About the year 1870 the Washington Mills of Lawrence, Massachusetts, undertook the manufacture of all-wool plaids made of fine yarns in imitation of the French goods. Technically the experiment was a success; the quality of the American fabrics was admirable. But at that time the

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mills could not compete with the French in the matter of cost. Now, however, the production of these fine, all-wool goods is firmly established in the United States, and American manufacturers, the Arlington Mills among them, have attained a very high standard of excellence.

When knit fabrics superseded for underwear the twilled flannel, which had long been used for that purpose, woolen manufacturers turned their attention to plain woven flannel in plain colors, called ladies' cloths and tricots, and to stripes and plaids. These goods are still worn to a considerable extent, and the fine, light-weight broadcloth, used for ladies' wear, is produced here in competition with the best foreign fabrics.

It is the distinction of the Arlington Mills to have been the first to establish on a large scale in this country the manufacture of black alpacas, mohairs, and brilliantines, though at about the same time similar goods of fine quality were produced by the Farr Alpaca Company of Holyoke, Massachusetts. Black alpaca of English manufacture had come into large use in the United States, following delaines. This alpaca was an eminently serviceable fabric, fit for almost all occasions. It soon acquired the widest popularity. Strong efforts were made to reproduce the English fabric in this country, but it was a perplexing task to recreate the color, the lustre, the finish, and all the distinctive English characteristics.

English manufacturers insisted that the fabric never could be made here, and it had obtained such

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a hold upon dealers and consumers that it was thought that there was something in the climate, the soil, the sky, or the atmosphere which would prevent the reproduction of this particular cloth in the United States. Several mills attempted the manufacture of alpaca on a small scale, but all were forced to abandon it as impracticable.

In 1872 the Arlington Mills, which hitherto had been successfully employed on plain and plaided poplins, began to produce alpaca first of the lower grades, but finally of fourteen qualities. Even after the goods were satisfactorily manufactured, it was difficult to put them on the market. Merchants were accustomed to ordering their alpacas from England and were reluctant to believe that they could be produced anywhere else. There was a similar narrow prejudice among their customers. One of the first sales of the Arlington alpacas was to the late Eben D. Jordan, founder of the firm of Jordan, Marsh & Company, of Boston, who followed his experiment with large orders.

Mr. Jordan was one of the ablest and most progressive merchants of his time. His breadth of view and the steady development of the American textile manufacture are both very interestingly reflected in this statement by Mr. Jordan in the *Boston Transcript* of March 3, 1869:

The firm has now been in business more than eighteen years. When they began, there were but one or two articles outside the plain cotton fabrics in their trade that were not obtained from abroad; now but one-tenth of their entire stock yearly sold passes through the custom house, and that is composed of the highest range of goods not

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sought for by the people at large. Mr. Jordan's experience, gathered from repeated visits to distant markets, leads him to confidently believe that ere long America will depend entirely upon her own industry to clothe the masses of her people, and eventually will command her share of the trade of the world.

A large part of this prophecy has already been abundantly verified. America now out of her own industry does clothe the masses of her people. In the Centennial Exposition of 1876 at Philadelphia, the Arlington Mills presented an exhibit of its dress goods—the only such exhibit, with one exception, made by any American establishment. These goods won the outspoken admiration of foreign visitors and secured an award from the judges “for a very superior collection of black alpacas, brilliantines, figured mohairs, and Roubaix poplins, all first-class goods of their kind, very uniform in width, color, and finish, and being of recent introduction reflect great credit on the manufacturers.” This victory was the result of a high and honorable ambition and of iron perseverance, a liberal expenditure of money in well-considered experiments, and the most precise technical skill.

Yet scarcely had these splendid results been accomplished than fickle fashion began to abandon the lustrous, hard-finished fabrics for the modern dress goods described in a preceding chapter. Here again the Arlington management was quick to recognize and meet the change by the designing of new fabrics, the installation of new and expensive machinery, and the introduction of new but successful processes of manufacturing.

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All these things, however, would not avail without adequate tariff protection, to cover the difference in wage cost between this country and Europe. The law of 1867 did not contemplate the classes of dress goods that had come into vogue, and did not give this adequate protection to the newer fabrics. American manufacturers, paying wages twice as high as those of Great Britain and three times as high as those of the Continent, found overwhelming odds against them, and for a long time made only slow and difficult progress. Thus, the importations of dress goods in the year 1880 amounted to over 68,000,000 yards, while the American production for the same period amounted to only 40,000,000 yards. Therefore the American manufacturers appealed to the Tariff Commission of 1882 for new rates of duty that would be in reality protective. The chief spokesman for the American industry on this occasion was Mr. William Whitman, then Treasurer and now President of the Arlington Mills.

The Tariff Commission, while recommending a reduction of rates on other wool manufactures, proposed to Congress a new clause covering all-wool merino dress goods in a way that promised to encourage their production here. But Congress did not accept the suggestion and reduced the duty as fixed by the Commission to a figure that proved altogether inadequate. Under the tariff of 1883 our importations of dress goods increased steadily from a foreign valuation of \$15,349,000 in 1884 to a foreign valuation of \$19,793,253 in 1889. Again,

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in the tariff revision of 1890, the American manufacturers appeared before Congress and asked for adequate protection not only for all-wool but for the cotton warp dress goods that were increasing in importance. Mr. Whitman was this time also the champion of the American industry, and the increased protection which he sought was granted by the national lawmakers.

The art of making dress goods is one of the most uncertain and hazardous of industries, and long-continued success in this art is most difficult of attainment. Sometimes it will be plaided styles that are "all the rage"; then stripes, then fancy weaves in small figures; then brocades in large figures requiring Jacquard looms; sometimes plain weaves, sometimes narrow twills, and sometimes wider ones, called serges. Sometimes the demand is for lustrous goods; sometimes for fabrics of a dead finish. So the imperative kaleidoscope of fashion turns and turns, and the successful manufacturers of to-day must have the power not only to recognize but to anticipate these ever-changing demands upon their technical ingenuity and financial resources. Need there be wonder that many fail and few succeed?

THE MERCERIZING PROCESS

IN a previous chapter we have referred to the extensive application in the Arlington Mills of the process known as mercerizing. It has come to be a great and valuable factor in modern textile manufacturing. The article of commerce that is known as "mercerized cotton" is a silk-like product resulting from the saturation of tightly stretched cotton yarns or cotton cloth with a solution of caustic soda, the yarn or cloth, while still tightly stretched, having the alkali washed out with water.

The process is called "mercerizing" because in its chemical aspects it was originated by one John Mercer, an Englishman, who took out a British patent on October 24, 1850, for a method of subjecting vegetable fibres and fibrous materials, cotton, flax, etc., to the action of caustic soda, caustic potash, sulphuric acid, or chloride of zinc, and of washing the material with water or acidulated water. But Mercer did not realize the value of the mechanical expedient of having the yarn or cloth tightly stretched during these operations, nor did he discover that only caustic soda and caustic potash are capable of producing the desired silky lustre, and that cotton and flax are the only vegetable fibres that admit of the successful application of this process.

These vital details were left to be developed by Horace Arthur Lowe, an English chemist, whose

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patent bore date of March 21, 1890. It is a pathetic fact that Lowe never received any advantage from his discovery. Like so many other originators of valuable processes or devices, he failed to enlist the co-operation of the energy and capital of an enterprising manufacturer. He did not even receive encouragement enough to enable him to keep his patent alive in the United Kingdom, and he never even applied for a patent to secure his invention in the United States.

Meanwhile the enlarged use and better understanding of the long, fine fibres of Sea Island and Egyptian cotton, especially adapted to the mercerizing process, and a reduction in the cost of caustic soda brought nearer the time when the processes of Mercer and Lowe could be made commercially successfully. On March 4, 1896, Richard Thomas and Emmanuel Prevost, proprietors of dye works in Crefeld, Germany, secured a German patent for what purported to be an improvement on John Mercer's original process by keeping the yarn or cloth under tension until after it had been washed. Beyond this purely mechanical advantage, Thomas and Prevost gave no indication that they regarded their patent as anything more than co-extensive with Mercer's, and they clearly declared that it was applicable to all vegetable fibres and could be practised as successfully with sulphuric acid and chloride of zinc as with caustic alkali. When they sought a patent in Great Britain they were met on November 30, 1896, by opposition from Lowe and were defeated, or rather were adjudged to be entitled to a

patent only on condition of omitting all reference to alkaline lye. Their British application was consequently abandoned, and the German Patent Office, on June 9, 1898, adjudged void their patent of March 4, 1896, on the ground of its anticipation by Lowe's patent.

Thomas and Prevost, however, prepared to make a hard fight for what they regarded as their exclusive rights under patents granted to them on March 15, 1898, in the United States. The officials of our Patent Office had overlooked the Lowe patent, and this consequently had not been cited as a reference in America. Thomas, Prevost, and their associates brought suit upon their American patents against three important manufacturing establishments, one of which was the Arlington Mills. Though the Arlington management was invited to join in the mercerizing monopoly under these patents, and was given an opportunity, with a few other concerns, to turn the mercerizing process to exclusive account, it determined to stand aloof from the monopoly and to fight its pretensions in the courts.

The litigation was begun in the year 1900. The case of the defence was complex and difficult. It was necessary to prove that there was no merchantable cotton which, when manufactured into yarn or cloth and then subjected to the process described in Lowe's patent, would fail to develop and manifest a silky lustre of such a character that the differences between the effects thus produced on different grades of cotton were merely differences of degree.

Counsel for the Arlington Mills and the other establishments interested were forced to conduct a scientific investigation of the nature of silky lustre and a searching examination of the history of mercerization.

But the courage of the Arlington management in standing out with a few other concerns against the aggressive monopoly was rewarded when, on August 7, 1906, Judge Francis C. Lowell, in the Circuit Court of the United States for the District of Massachusetts, held that in view of Lowe's British patent the Thomas and Prevost patents were invalid. The complainants did not appeal from this judgment, but after some delay finally submitted to a dismissal of all their suits.

In the uncertain years when the decision of the court was pending, the Arlington Mills bound themselves by formal contract to protect their customers against the arrogant claims of the monopoly. This step was rendered necessary by the fact that the concern which held by mesne assignments the professedly exclusive rights under the Thomas and Prevost patents in the United States, not content in instituting suits against the Arlington Mills and their associates, went to the extraordinary length of threatening to prosecute the purchasers of mercerized goods from the Arlington Mills and other companies. A circular containing this threat was widely issued to the trade. To this menace the Arlington Mills, on the advice of its counsel, replied that the patents were for processes and had nothing to do with products, and that it was only the manufacturer

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and not the purchaser who could be made liable for mercerizing under tension if the validity of the patents were maintained.

Nevertheless, the monopoly proceeded in its efforts to frighten the possible purchasers of the mercerized goods, and the Arlington Mills met this undertaking by binding themselves in a formal contract to protect their customers against any liability. This proved acceptable in all but a few cases, and the monopoly failed to exercise any important, terrifying effect until its power was forever broken by the decision of the Federal Court. This decision, won after a long and arduous contest, has proved to be of very great economic significance, for the mercerizing process has now become established all over the United States, and the benefits of the process have accrued to all manufacturers who have desired to undertake it and to the public at large.

IMPROVED CONDITIONS IN MODERN MILLS

ALL of the manufacturing concerns represented by William Whitman & Company, whose work has been described in the preceding chapters, are distinctively modern mills in all the characteristics of their equipment and construction. In the Arlington Mills, the Manomet Mills, the Nonquitt Spinning Company, the Nashawena Company, The Eddystone Manufacturing Company, and the others mentioned, the health and comfort of the operatives are very carefully considered, both because these precautions are the rightful due of the working people, and because an enlightened self-interest to-day demands health and comfort as essential to the highest industrial efficiency. The mills are all amply, but not excessively, heated when heat is necessary, and are ventilated with scientific thoroughness. The most improved processes of sanitation and hygiene are embodied everywhere. The Eddystone Manufacturing Company has groups of model dwellings, and the environment of these dwellings and of the mills themselves is made as attractive as possible.

The lot of the mill operatives in these modern structures is vastly superior to the condition of the same classes of workers a half century or even fewer years ago. Once textile operatives in this country worked thirteen hours a day, or seventy-eight hours

IMPROVED CONDITIONS IN MODERN MILLS

a week. These were hard, long days, spent often in poorly lighted, poorly ventilated buildings. All these things have been wonderfully changed for the better in recent years by regulation of law, in part, but still more by the voluntary efforts of liberal and far-seeing manufacturers. In Massachusetts the hours of labor for women and children in the mills have been gradually reduced until the limit is set at fifty-six hours a week, in a law which has just become effective.

One interesting beneficent development of the textile industry, in which the Arlington Mills were the pioneers, was the weekly payment of operatives, a procedure now, and for a long time past, required by the laws of Massachusetts. Until the year 1877 the Arlington Mills, like other manufacturing concerns, had followed the practice of paying their employees once a month, but Mr. Charles Wainwright, then and now the paymaster of the Arlington Mills, became impressed with the practical advantages that would result from a system of more frequent payments, and he brought the subject to the attention of the treasurer, urging that operatives who are paid only once a month are compelled to purchase their necessary supplies on credit, and are thereby tempted, and indeed often forced, to incur a large indebtedness. At first the experiment was adopted, on July 1, 1877, of paying every two weeks. The system proved so satisfactory that at the end of 1877 a plan of weekly payments was substituted for it, and this has ever since been the practice of the Arlington Mills. This was the

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first corporation of any importance in Massachusetts to adopt the progressive and helpful policy which eight years later was made compulsory on all manufacturing establishments in Massachusetts by the General Court.

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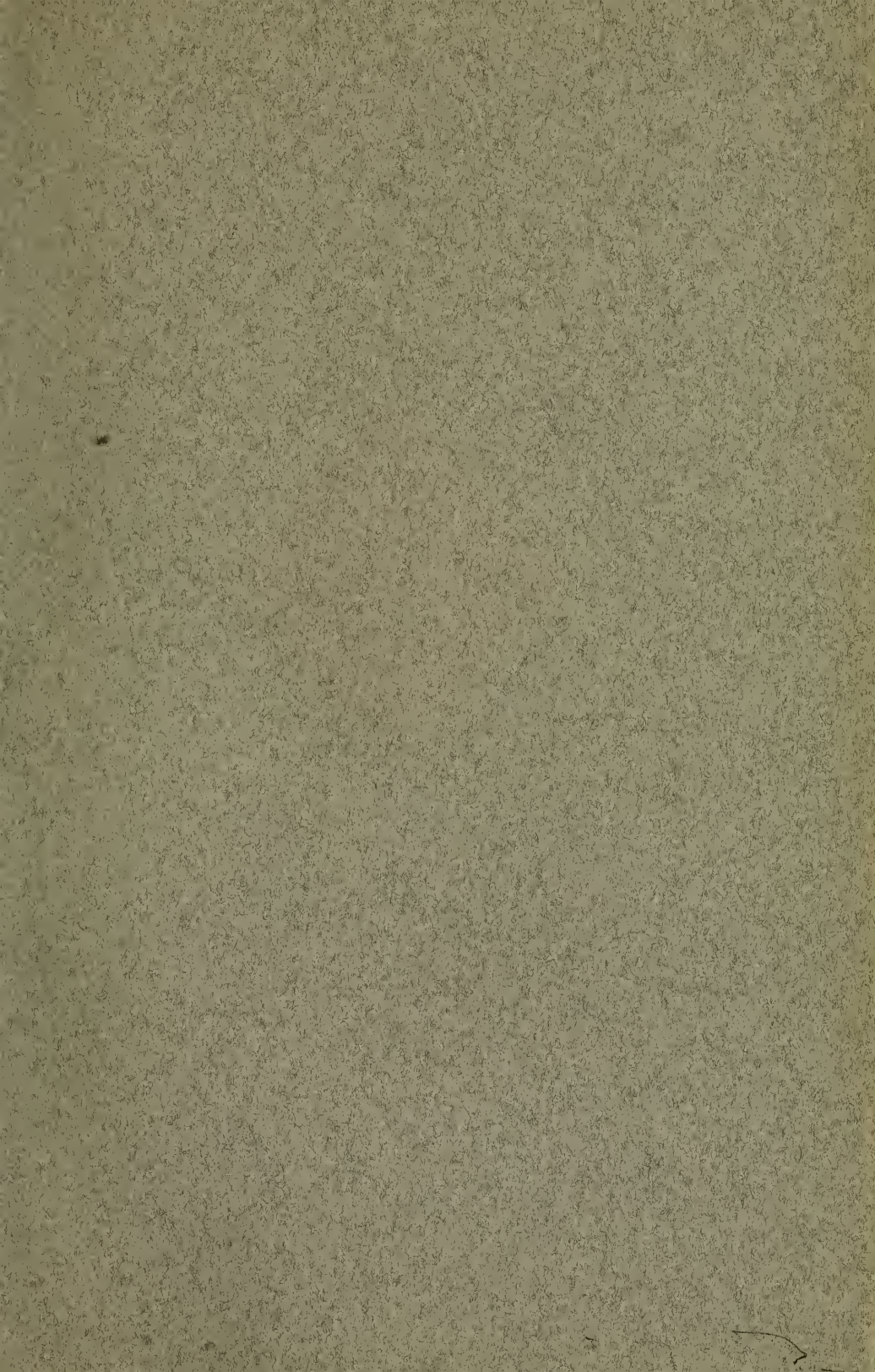
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